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THE SKILLS REQUIRED FOR A CYPRIOT AS A EUROPEAN CITIZEN: THE ROLE OF EDUCATION

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A thesis submitted for the degree of Doctor of Education

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ABSTRACT

This thesis is concerned to examine the prospects for the development of a high skills economy in Cyprus. Cyprus as a new member in European Union, has to follow different routes guided by Brussels commission.

The major research question is what does the experience of Cypriot policy and practice tell us about the theories of skill formation?

The thesis examines the relationships between education, skill formation and economic development in Cyprus. Its intention is to open a much needed debate on the subject of High Skills formation view as Cypriot education is on the way for major reform. The big question is trying to be answered in my thesis is in what ways the education has to be changed to allow for the learning and development of these skills.

My suggestion is to invest in education (especially the vocational education) as well the training policies. The study is a literature study based on existing material on skill formation policies. The literature reviewed comes from primary and secondary sources, such as existing reports, the Internet and policy documents of published and unpublished material.

Brown and Lauder (2001) argue that acquisition of high skill does not remain the property of the privileged minority. However, more recently questions have been raised about the global demand for high skill work and whether the opportunity for developing such work in Cyprus is now a possibility, given the rise of high skill low waged workers in countries such as India and China.

Through the thesis development is obtained that Cyprus has not been able to address issues of skill formation. This is because:

1. The role of education in Cyprus has been intimately linked to its history, especially a history that has stressed nationalism.

2. The strongly academic influence of Greece.

3. The unpredictable nature of demand for skilled labour in a small island economy.

4. Tourism is mainly low skill but because it demands face to face interaction it is sheltered from the Global Auction.

5. The failure of policy attempts to develop closer links between education, including vocational education and the labour market. All these policies, the last 35 years have failed irrespective of the political parties were in power and their ideology.

However, high skills policy and the entrance in European Union as well are not panacea. They are not the magic medicines for economic development and prosperity.

The thesis suggests some useful steps towards a more effective model of skills formation for Cyprus. In order to achieve this task, political commitment is a requirement. Also the policy makers in Cyprus have to consider the international situation regarding skills of the future and they give a clear signal and role for all the local 'players'. The junction points are the economic crisis as well the discovery of gas which could change the demand for skilled workers. The question is whether the Cypriot vocational education system could respond appropriately and flexibly as there are many external forces acting as constraints on such a small economy…

‘*… Britain (and Cyprus or any other nation,* ***personal comment****) can only succeed in a rapidly changing world if we develop the skills of our people to the fullest possible extent, carry out world-class research and scholarship, and apply both knowledge and skills to create an innovative and competitive economy ...*’ DIUS (2008)

CHAPTER ONE

INTRODUCTION

> We are living through a transformation that will rearrange the politics and economics of the coming century. There will be no national products or technologies, no national corporations, no national industries … all that will remain rooted within national borders are the people who comprise a nation. Each nation's primary assets will be its citizens' skills and insights … The real economic challenge facing the United States in the years ahead – the same as that facing every other nation – is to increase the potential value of what its citizens can add to the global economy, by enhancing their skills and capacities and by improving their means of linking those skills and capacities to the world market (Reich 1991, pp. 3 & 9).

This thesis is concerned to examine the prospects for the development of a high skills economy in Cyprus. The standard view of the development of a high skills economy is expressed by Robert Reich in the quote above. Reich assumes that the borders between labour markets will be removed and that increasingly there will be a global labour market for skilled work. In this context the crucial task for Reich and indeed the majority of economists and policy makers is how to raise the education and skill levels of the population. In other words, the problem for states in a borderless world is how to raise educational achievement such that it provides citizens with the possibility of gaining a share of high skilled work. Essentially, this is seen as a supply-side problem and reflects the assumptions of the dominant human capital theory (Becker, 1962). As a result individuals become more educationally qualified so they will become more productive. Employers then hire these more productive skilled workers, even at a higher price than less skilled workers because they are more productive. The supply of skilled workers creates its own demand.

Based on the above argument, the focus is on how to develop educational policies that will ensure increasing opportunities and an increasing supply of high skilled workers.

This view presented by Reich (1991) has become orthodoxy with respect to the importance of skills in the contemporary global economy.

Why high skilled work is at a premium in the global economy? Many commentators argue that there is a link between globalization and the idea of a knowledge economy. It has been argued by management gurus (e.g. Drucker, 1993) that what characterizes the nature of the present economy is knowledge. This is because innovations are crucial in a highly competitive global economy. Therefore, various forms of innovation including product and processes are central to competitiveness. At the same time, electronic technology has enabled greater communication and efficiency in the construction of global businesses. These forms of technology, it is claimed, require greater education than previously to exploit their potential. It is on this basis that the management guru Peter Drucker (1993) argued that we were in a new stage of capitalist development which would move power from the owners and managers of capital to knowledge workers. Not only would they assume power but with it would come greater autonomy, creativity and rewards.

A related view has been advanced by an influential group of economists, skill bias theorists (e.g. Acemoglu, 2002) who argue that the demand for higher skilled workers, particularly graduates, is a function of the introduction of new knowledge intensive technology such as the computer.

It is for these reasons that Evertsson (2005) feels able to assert that:

> We live in a society that is characterized by a knowledge-driven capitalism which has created the notion of a global labor market. The countries that want to jump on to the racing ‘globalization training need to upgrade their workforce to a high skill standard (p.1).

A further argument for the significance of education and skills comes from David Baker (2009). In what Lauder (2009) has described as one of the most sophisticated defences of human capital theory, Baker has argued that:

> Educated workers enable intensive rationalization in the workplace through the processes of accounting and auditing, elaborate legal contracts, corporate social responsibility, human relations and strategic planning amongst other characteristics (p.161).

As such, the rise of mass higher education has enabled the transformation of organisations since all the functions he describes above require rational, educated workers.

However, the possibility of a high skilled society as envisaged by Evertsson (2005) also creates the opportunities for greater equality of opportunity as, in principle, more highly skilled jobs are created. Lewis (2007) implies that a high skill society addresses both the issues of economic competitiveness and social justice. Specifically:

> Skill policies must proceed on the basis of assumptions we can make about societies. On one level we must be able to take for granted that the skill provision system is premised on an equal opportunity principle. This means that all citizens should have relatively equal access to basic and higher education. A further assumption must be that there is reasonable correspondence between jobs in the economy and the skills produced by educational and training systems (p.408).

What is significant about this scenario is that while it may enable the creation of productive citizens, while reducing welfare expenditure because of the employment opportunities created, it also bears an educational cost. As Crouch, Finegold and Sako, (1999) put it:

> For many political parties the encouragement of education seems to provide a means of ridding themselves of certain welfare commitments while at the same time offering government some opportunities for constructive and positive action. If people are educated they can probably fend for themselves in the economy without needing much

> support from the state ... An improvement in educational standards and levels has therefore become a major preoccupation of contemporary politics. The concern is almost solely with education that will be occupationally useful rather than as a civilizing mission or a broadening of minds (p. 5).

This latter point is relevant to the question of skill formation in Cyprus and one to which I shall return.

What has been presented above is the orthodox view of the relationship between high skills, globalization and the knowledge economy. If this view was to be accepted then the focus of this thesis would be entirely on the supply side and in particular it would be concerned with policies that would raise access to education for all, provide the appropriate curricula and training and the mechanisms by which skilled workers can enter the labor market. However, more recently questions have been raised about the global demand for high skill work and whether the opportunity for developing such work in Cyprus is now a possibility, given the rise of high skill low waged workers in countries such as India and China (Brown, Lauder and Ashton, 2011). This point leads to the issue of whether considerable headway can be made within Cyprus as regards the supply and demand for high skilled work in ways which enables it to be insulated from global trends. Finally, if such a possibility exists then a supply side focus on education is appropriate. Then the perennial issue of the academic/vocational education division assumes significance.

The reason why the question of the possibility of a high skilled economy and society is significant to Cyprus is that my home country entered European Union on 1st of May 2004. The timing of the accession of Cyprus to European Union is very important as Europe *dances* to the rhythm of Lisbon agenda.

In the case of Cyprus, the Lisbon Agenda gave impetus to the question of creating a high skills economy. It prescribes three main objectives for Europe's education and training systems:

> … the development of local learning centers, the promotion of new basic skills, in particular in the information technologies, and increased transparency of qualifications (Council, 2000a, p. 12).

The Lisbon Agenda and its application in the Cypriot context will be discussed in the following chapters of this work within the framework of issues articulated above.

However, through this long research experience the initial question has been modified to *what does the experience of Cypriot policy and practice tell us regarding the theories of skill formation*. Cyprus is a small economy and none of the existing theories seems to apply. That is raised fundamental questions about the nature of the polity, economy and society in Cyprus on the one hand, the failure of the range of skill formation theories to address the Cypriot case on the other.

The initial question for Cyprus was one of how to raise the supply of skill levels while also creating or fostering the demand for skills. The aim of the thesis was to set the context for developing a high skills policies in Cyprus by discussing and clarifying the key debates relating to skills and then asking how they had application in the Cypriot case. In order to address this second issue the basic features of Cypriot education and the labor market will be presented and some critical issues concerning them will be discussed. This establishes the key question of how the production of skills through education and co-ordination with the labor market can best be achieved.

1.1. STRUCTURE OF THESIS.

This is a desk study based on existing literature material on skill formation policies. The literature reviewed comes from primary and secondary sources, such as existing reports, the Internet and policy documents of published and unpublished material.

It is important to have in mind that this work covers a six years period, from the summer of 2004 up to the May of 2010.

The contribution that the thesis makes to new knowledge concerns an account of why skill formation theories offer little or no guidance in the Cypriot case.

The study is in two parts. Part 1 (chapters 2, 3 and 4) seeks to present the research methodology and clarify key issues regarding skills, the understanding of skills and the global knowledge economy. Part 2 (chapters 5, 6, 7 and 8) contextualises these understandings within the context of the Cypriot skill formation system.

Chapter Two covers the research methodology and the strategy regarding the analysis of the data from secondary sources. A literature review regarding education and the knowledge economy is the topic of Chapter Three which aims to shed some light on relevant theoretical aspects. In particular, it considers the relationship of national skill formation systems to global changes in the labour market. Chapter Four discusses the range of approaches to understanding skills in 21st century, placing this understanding within the context of the global changes. It is important to understand that Cyprus is a small island economy vulnerable to global forces and the debates in relation to the global knowledge economy give a direction in understanding why skill formation theories have offered so little guidance. In Chapter Five, I will give the background to the Cypriot Education system presenting its aims and priorities. Chapter Six gives the background to the economy and labour market in Cyprus. My task in this chapter is to assess the question of what demand there might exist for high skills work and whether it can be insulated from the global demand for high skilled work. Chapter Seven discusses what can be learned from the debates on the global knowledge economy and skill formation for Cyprus. In Chapter Eight, I will consider an external evaluation carried out by a European team and an internal evaluation by a group of Cypriot researchers regarding the High Skills environment in Cyprus. In Chapter Nine, the Conclusion, I come back to the fundamental question as to why skill formation theories offer little guidance.

1.2. BACKGROUND

In the next few paragraphs, I will provide some general, relevant background on Cyprus.

Cyprus is a small island in the Mediterranean Sea with population around 700, 000 people. In its recent history it was a British Colony from 1878 to 1960. Cypriots took their independence in 1960 whereas in 1974 Turkey invaded in the island and occupied 40 % of its area. This situation continues up to now.

> The historical context of the island was very specific and very influential in the development of its educational affairs. The historical context affects, also, its political and economic affairs (Persianis, 1996, p. 46).

Most Cypriot education researchers use chronological classification of the Cypriot history of education according to the country's major political events. The reason for this chronological division is that political events have explicitly determined curriculum contexts and formations (Koutselini, 1997).

1. The period of the Turkish occupation, 1571-1878: This began in 1571, when the Turks conquered the country from the Venetians, and continued until 1878 when Britain took over the country after signing the Cyprus Convention with Turkey against Russia.

2. The period of British rule, 1878-1959: In 1878 Britain leased Cyprus and in 1914 promptly annexed the country, which became a British Crown Colony. British rule ended in 1959, after a four year armed struggle with the ultimate hope of freedom from the British rule and union -*enosis* - with the motherland, Greece.

3. The period of Independence, 1960 - 1974: On 1960, Cyprus became independent as the Republic of Cyprus, with guarantors of safety Greece, Turkey and Britain. The

first problems with the new constitution arose in December 1963, when bi-communal fighting occurred between Turkish and Greek Cypriots. The situation remained difficult until, on 15 July 1974, a Greek military coup d' etat attempted to impose union (enosis) with Greece, offering Turkey a pretext to invade, on 20 July, gaining control of nearly 37 percent of the country in the north. Greek Cypriots fled to the south and Turkish Cypriots to the north.

4. The period after the Turkish invasion, 1974 - 2000: The Turkish invasion was destructive in all aspects of the life of the country. However, Cyprus managed to recover in a very limited period of time achieving what is known as an economic 'miracle'. Reunification with the occupied part remains for Cyprus a national goal. This period ends with the introduction of the Unified Lyceum (Eniaio Lykeio) in relation to educational progress.

5. The period of 2000 - today: This period is characterized by the entrance of Cyprus in European Union, the Annan plan for political solution (it will be analyzed in the following chapters) and coordinated trials for educational reform.

Referring to Myrianthopoulos (1946), during the periods of both Turkish (1570–1870) and British rule (1878– 1960), Greek Cypriot public education had, as its primary aim, the cultivation of national or ethnic Greek identity. That was the Orthodox religion, Greek language and a historical awareness, favouring Cyprus's claim for political union with Greece. This 'ethnic' education was supported through the adoption of the Greek standard curriculum and the use of textbooks edited in Greece.

After independence in 1960, the responsibility for Greek education was entrusted to the Greek Communal Chamber and a Board of Education. Turkish Cypriots were educated under the rules of the Turkish Communal Chamber. The dividing elements of the constitution resulted in the polarization of the two ethnic communities which strove hard to strengthen their links with their respective mother countries.

Philippou (2009) states that the foundations of the Republic of Cyprus through the 1960 Constitution separated each community clearly in terms of ethnic origin, language, culture and religion i.e. Greek Community with Greek language, Greek cultural traditions and Greek Orthodox Church. In contrast the Turkish Community comprises Moslems who share the Turkish cultural traditions.

According to Spyridakis (1974), the Greek Communal Chamber, after independence, followed a policy of *Hellenization,* i.e. 'considered as its main task to set education free from any colonial links in order to help schools establish their genuine Greek character' (p.205). After the 1963 inter-communal troubles the separatism between Greek and Turkish Cypriots was a fact. At that time Greek Cypriot Ministry of Education was established.

Having as reference the invasion of 1974, the primary objective of the Greek Cypriot educational system has been to educate the new generation of Cypriots about the part of the island that is occupied by Turkey and support the trials for the reunification of the island. This educational goal was integrated in the school curriculum and became part of everyday classroom and school-wide activities (Christou 2006, p. 286).

Christou (2006) goes on to state that the post-1974 goals set by the Greek Cypriot educational system reflect the belief that education can and should be at the forefront of national struggles (p.301).

Given this background I now move to Part 1 concerning research methodology and the clarification of the debates concerning the global knowledge economy and skill formation. In chapter Two, I will deal with the basic aspects referring to research methodology.

PART 1

Research Methodology, Review of the Literature and Debates on the Global Knowledge Economy and Skill Formation

CHAPTER TWO

RESEARCH METHODOLOGY

The success of any research depends on the design of the research itself as well as on the available data. So it is important to consider which method should be appropriate to gather the necessary information.

Referring to Petrou (2007) a methodological war posed quantitative against qualitative researchers with the former having a positivistic perspective on educational research and believing that human behaviour is governed by general universal laws on educational research and with the others having an interpretive perspective in which human behaviour is seen as socially dependent and context related.

However there is a middle road a *mixed methods research*. A theoretical definition for the mixed-methods methodology is given by Cresswell et al (2002) according to which:

> Mixed methods research is research that involves collecting, analysing, and integrating both quantitative and qualitative data in a single study or in multiple studies in a sustained program of inquiry (Cresswell et al, 2002, p.3).

For this thesis, normally the best way to assess the High Skills environment is to interview a number of the key policy makers and players in education and business. These persons could be the Minister of Education and other policy makers, representatives of the economic sector, and of labour. In addition, representatives of the planning bureau, higher education as well as teachers and teacher unions would be conducted. Their interviews could be compared and placed within the context of quantitative data on skill formation. In essence, the interviews would be there to explain

the policies underlying these data and to establish their thinking on the way forward. However, there are good reasons in the Cypriot case as to why such a strategy is likely to be flawed. There are at least three reasons for this.

The first reason is that although there are quantitative data on the performance of the Cypriot education system the quantitative criteria for judging it is a matter of debate. A UNESCO report (1997) highlights the fact that the Ministry of Education is adopting outcomes of educational research which is mainly based on quantitative criteria, has attempted innovations, introduced new approaches to teaching and changed the curriculum for the purpose of improvement and development. But there still remains widespread dissatisfaction with the effectiveness of these measures.

A characteristic example of this situation is the policy to have classes with 25 pupils maximum. That is based on the views of the basic educational stakeholders in order to improve the outcomes of education. However, some important qualitative characteristics are ignored as the training of the teachers as well the involvement of ICT in teaching practice.

Another example is the introduction of new subjects (according to the views of teachers and Pedagogical Institute) such as Computers, Design and Technology, Home Economics and Education on the Environment without the support of the syllabuses in school curriculum.

The above two examples are high cost innovations in personnel salaries as well in premises and equipments and that what this shows is ineffective planning that has not thought through all the resource implications for the policy.

In both cases it is possible to see why there is dissatisfaction with the quantitative indicators and judgements as to effectiveness.

The second reason is that the statements made by policy makers, as regards the relationship between policies and official statistics would need to be regarded with some scepticism, as would their views on how to overcome current problems and future

developments. What is clear in the case of Cyprus is that there is considerable inertia when policy intentions are turned into practice. A characteristic example is the need for reviewing and modernising the process of management of personnel, the system of selection and appointment of teachers, the pre and in-service training, the system for appraisal and promotion and the system for posting and transferring of teachers. Those topics (obtained from many reports and reviews of the educational system) are in the top of the agenda of discussion between policy makers and teacher unions. However, after twenty years we are still at the starting point. That is to say that despite concerns raised in reports about these systems very little has changed.

Another example is the need for setting national standards for improvement in methods of teaching and learning. There has been much discussion of this issue but with considerable inertia because there is a concern that teachers will be judged against these standards, when we have seen that fair conditions for making such judgments are absent.

In relation with my thesis topic, as we shall see, the attempts to integrate more closely education and the labour market have met with little success, despite the pronouncements of policy makers.

A third problem with this approach to policy formation in the Cypriot case is that being a small economy, which is subject to changing resources, technologies and labour demand, it is as a matter of practice, very difficult to plan for the kinds of skills that may be required in five or ten years time. For example, a major new development has been the identification of gas fields within Cypriot waters. Those were unanticipated by policy makers and hence there is no training for those working in the gas industry.

As a consequence of these considerations this study will rely on secondary data.

Boslaugh (2007) presents the major advantages and disadvantages of secondary data analysis. The first major advantage of working with secondary data is economy: because

someone else has already collected the data, the researcher does not have to devote resources to this phase of research.

The second major advantage of using secondary data is the breadth of data available. Few individual researchers would have the resources to collect data from a representative sample. The third advantage in using secondary data is that often the data collection process is informed by expertise and professionalism that may not available to smaller research projects.

One major disadvantage in using secondary data is inherent in its nature: because the data were not collected to answer specific research questions, particular information that may have been relevant to the study may not have been collected. A second major disadvantage of using secondary data is that because the analyst did not participate in the planning and execution of the data collection process, he or she does not know exactly how it was done.

Mogalakwe (2006) argues that:

> There is no research method that is superior to others. The choice of a research method should only be on the basis of such a method's appropriateness, including costs. To this end, the documentary research method should be utilised by social scientists with the full confidence that it is also a respected scientific method (p.29).

In this thesis most of the secondary data which includes judgements and opinions regarding Cypriot skill formation is taken from sources external to Cyprus because they may be considered more reliable.

Given the failure of policy attempts to develop closer links between education, including vocational education and the labour market irrespective political ideologies, the use of such reports from external organisations may be more therefore be authoritative regarding the real picture of Cyprus.

In addition to these reports, further data and evidence will be collected on the basis of public document sources including government publications, policy statements, census reports, statistical bulletins, reports of commissions of inquiry, ministerial or departmental annual reports, consultancy reports etc. I choose to examine through the given numbers and policy decisions what is exactly the situation in Cyprus.

Based on these considerations my thesis will focus in the following key research questions:

1. What are the major debates with respect to skills in the development of a high skills economy?
2. How do these debates apply in the Cypriot context?

In order to answer this question we need to ask:

3. What are the major features of the Cypriot education system with respect to skill formation?
4. What are the major features and trends with respect to the Cypriot labour market?

Given these questions there is a further overarching question:

What does the experience of Cypriot policy and practice tell us about the theories of skill formation?

Having the above methodology as reference, I will proceed to the development of my thesis.

CHAPTER THREE

EDUCATION AND THE KNOWLEDGE ECONOMY

In this chapter I will start with an account of the debates concerning the knowledge economy. The Greek philosopher Aristotle distinguished between three approaches to knowledge: *episteme* (scientific knowledge), *techne* (craft) and *phronesis* (practical knowledge).

Epistêmê is the Greek word most often translated as knowledge, while *technê* is translated as either craft or art. Epistémé is a pure knowledge that is demonstrable. *Techne,* art or applied science or skill is the ability to produce something reliably under a variety of conditions, on the basis of some reasoning. *Phronēsis* is dealing with ethics and values with reference to praxis.

In the 21st century, my strong belief is that we have to consider a combination of all the three Aristotelian approaches giving more focus on the *technê* route.

Let's now consider how this new knowledge interrelated with practical norms, will be developed. It is important to clarify at this stage the difference between knowledge and information. Leadbeater (1999) states that:

> Information can be transferred in great torrents, without any understanding or knowledge being generated. Knowledge cannot be transferred; it can only be enacted, through a process of understanding through which people interpret information and make judgements on the basis of it ... We do not need more information; we need more understanding. Creating knowledge is a human process, not a technological one (p.29).

This raises the question of how we can best understand knowledge that has economic application.

3.1 THE VIEWS ON ECONOMICALLY RELEVANT KNOWLEDGE

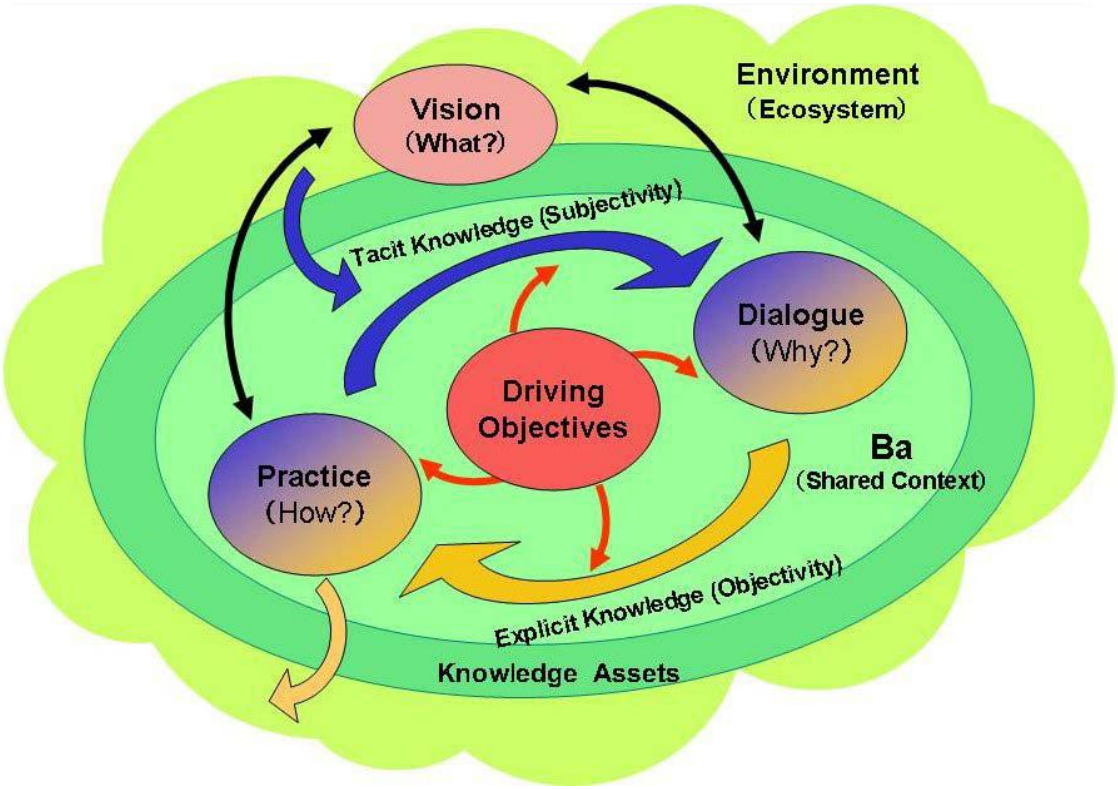
Keep and Mayhew (1999) adopt the approach that there are two different types of knowledge. First the abstract, theoretically based bodies of high level knowledge required by symbolic manipulators and analysts driving forward a knowledge–based economy which it is best acquired through formalized education and academic qualifications. It is this kind of knowledge that is often referred to in government policies and documents. For example, the importance of knowledge is emphasized by the Department for Education and Skills (2003):

> Our future success depends upon mobilizing even more effectively the imagination, creativity, skills and talents of all our people. And it depends on using that knowledge and understanding to build economic strength and social harmony (p. 2).

Second consideration is the tacit knowledge. In such a case the skills tend to be based on personal characteristics and psychological traits and crucially in the understandings obtained through the culture of the workplace. Nonaka and Takeuchi (1995) explain that the tacit aspects of knowledge are those that cannot be codified, but can only be transmitted via training or gained through personal experience. Tacit knowledge has been described as *know-how*.

Nonaka (2007) presented a model of knowledge creation in the International Productivity Conference 2007, Thailand, 18–19 January 2007 (the conference was jointly organized by the Asian Productivity Organization and the Foundation for Thailand Productivity Institute) based on the distinction between formal and tacit knowledge.

FIGURE 1: Dynamic Model of a Knowledge - Creation (Nonaka, 2007, p. 12)



In this model a key parameter is the knowledge vision. The essential questions that corporations need to ask are: For what purpose do we exist? Where should we exist? Why should we create knowledge? How should we create knowledge? These questions are prior to those concerning formal or, as he describes it, explicit knowledge and tacit knowledge. It is also important to see that knowledge production is about shared contexts and dialogues. In this sense it is fundamentally a social activity. The same fundamental questions regarding vision can also be asked from policy makers with respect to the development of a high skills economy. So here the questions might be related to: how are we creating a supply of skilled workers? To what purpose? How are they related to high skills strategies for linking the supply and demand sides of the economy?

Based on the above, I will now introduce the term knowledge economy.

The concept of the Knowledge Economy is a term that it is used in a plethora of contexts. Neef (1998) observes that knowledge economy is used ‘enthusiastically to describe a new

interconnected economy and the positive effect of newly emerging technologies in the workplace and home' (p. 1).

While there is considerable debate as to what is meant by a knowledge economy one of the characteristics that is shared by most theorists is the role of technology and in particular information and computer technology.

Lundvall and Foray (1996) argue that:

> Even if we should not take the ICT revolution as synonymous with the advent of the knowledge-based economy, both phenomena are strongly interrelated … the ICT system gives the knowledge-based economy a new and different technological base which radically changes the conditions for the production and distribution of knowledge as well as its coupling to the production system (p.14).

Brinkley (2006, p.13) summarised the key features of knowledge economy arguing that the knowledge economy represents a soft discontinuity from the past as it is not an economy operating to a new set of economic laws. The knowledge economy is present in all sectors of the economy, not just the knowledge intensive industries. The knowledge economy has a high and growing intensity of ICT usage by well educated knowledge workers. Also a growing share of GDP devoted to knowledge intangibles compared with physical capital. The knowledge economy consists of innovating organisations using new technologies to introduce process, organisational and presentational innovation. Finally the knowledge economy organisations reorganise work to allow them to handle, store and share information through knowledge management practices.

There are several specific models for knowledge development. However, the skill formation model developed by the World Bank provides a useful heuristic.

The World Bank (2003) presents four pillars for a Knowledge Based Economy (KBE). Those pillars cover areas like *Education for a skilled workforce, Science, technology and Innovation, ICT infrastructure* and *Policy and regulatory environment.* Talisayon (2006),

from his side, shows in the following table a model to achieve the pillars given from the World Bank.

TABLE 1: A Model of Knowledge-Based Development

	Economic (KBE)
Education (development of human capital)	Education for a Skilled workforce
Innovation(Development of structural capital)	Systems, processes, and technological innovations
Building Networks (Development of stakeholder capital)	Financial and physical networks, e.g., ICT infrastructure

While there is a variety of concepts, strategies, policies and initiatives aiming for a Knowledge Based Economy. The truth is that a Knowledge Based Economy approach is more a theoretical concept. The reason is that there is no widely accepted account of what comprises a knowledge economy, except perhaps with respect to knowledge and innovation and consequently what the role of education, apart from research and development should be.

In particular, there are two broad approaches to this question. The first orthodox view is best described by Stiglitz (1999):

> In the long run, success in the knowledge economy requires creativity, higher order cognitive skills in addition to basic skills. Those countries that find ways of fostering this kind of creativity will, in the long run, have more success in the competition of the knowledge economy (p.21).

Based on the above, Florida (2002) argues that within the knowledge economy, firms are compelled to develop a creative and innovative capacity that can generate new ideas, solutions and products. It is accepted that education is the most reliable vehicle for this journey.

Those theorists' views strongly resonate with that of Reich (1991) who is considered as the first and most insightful in terms of understanding the changing nature of work in a global knowledge economy. Reich (1991) argues that three dominant categories of work are emerging as a consequence of the new learning relationships. These are *Routine production service* such as blue-collar occupations, repetitive jobs in high-technology firms such as data processing, which considered as globalised occupations. *In-person services* are for example shop assistants, waiters and security which can only be delivered locally. *Symbolic analysts* are found in occupations such as scientists, information technology professionals, consultants and cultural workers which are 'traded' worldwide. What these symbolic analysts do includes:

> Problem solving, problem-identifying and strategic brokering activities ... Like routine production services (but unlike in-person services), symbolic analytic services can be traded worldwide and thus must compete foreign providers … but they do not enter the world of commerce as standarized things. Traded instead are the manipulation of symbols, data, words, oral and visual representations. (Reich, 1991, p. 177).

This account of symbolic analysts is important for the analysis when it comes to Cyprus. For example, tourism is a major industry in Cyprus and while some parts of tourist work can be off shored, such as ticketing, most tourist work comprises in-person services. However, this is low skill work and the challenge is to raise the levels of skills in relation to it. When writing the book in 1991, Reich believed that symbolic analysts were and would be the fastest growing type of work due to the increased value attached to them by corporations. As it will be seen, new research by Brown et al. (2011) challenges this view.

A key element of the knowledge economy for Reich and many others is the role of education in producing both innovations and highly skilled symbolic analysts. The role of innovation has been called by Viale and Etzkowitz (2010) the capitalisation of knowledge, that is the way research and development in universities are converted into assets and revenue producers. According to them there is a triple helix of co-evolving networks of communication between three types of institution: universities, industry and government. For Viale and Etzkowitz a key part of this process is that there is an increasing integration between basic science research and technology. Without doubt, innovation is central to economic competitiveness and part of the success in the application of basic knowledge is its integration with technology and business.

For Cyprus, two key questions are raised by the discussion of the triple helix in innovation. The first is what contribution is research in universities in Cyprus making to innovations that can be converted into the capitalization of knowledge? The second is: are university departments of science and technology changing in an attempt to meet the demands in the development of an emerging knowledge economy?

However, the emergence of ICT and the significance of innovation for competitiveness also have implications for schools as well as universities. It seems to be an imperative to change traditional relationships within universities in the merging of basic science and technology and between universities and business. Based on this, it has been argued that similar kinds of changes are needed in schools.

Buckley and Caple (1990) mirror this reconfiguration of education by defining it as:

> A process and a series of activities which aim at enabling an individual to assimilate and develop knowledge, skills, values and understanding that are not simply related to a narrow field of activity but allow a broad range of problems to be defined, analysed and solved (p. 14).

From the mid-1990s onwards, publications from the European Commission (1995) have suggested that the shift in educational policy needed to meet the objectives involved in an

education for the knowledge economy. This will consist in more than just an expansion of education and training as it has been known. This shift will involve an extension of new learning relationships to all types of institutions and require a commitment from each individual to become lifelong learners throughout all stages of their lives (Young, 1998). In particular, there has been a strong emphasis on fostering creativity.

Adams and Demaiter (2008) argue that:

> While most writers agree that education is important to employment in the new economy, there is disagreement about whether education is primarily important as a source of skill, or whether the credentials, contacts and work habits students acquire through education are more important, while real skill acquisition occurs on the job (p. 359).

Here we can begin to see how fundamental changes in the knowledge economy are bringing about calls for fundamental changes in education. Riddell (1996) argues that:

> Changing trade patterns influence the productive possibilities of the economy and thereby the demand for education, the uses put to education, and the demands made on education for tailoring the workforce to those demands (p. 1363).

For Cyprus, one of the questions to be raised from this discussion is how much, if at all, the education system is changing, especially in seeking to meet the demands for creativity called for by some of the theorists cited above.

3.2. LINKING EDUCATION TO THE KNOWLEDGE ECONOMY

There are three main positions regarding the way that work and skills need to be faced within capitalist economies i.e. *the knowledge economy optimists*; *the knowledge economy pessimists;* and *the contingency theorists.*

The Knowledge Economy Optimists

Piore and Sabel (1984) claim that how the knowledge economy is understood is linked to a series of theoretical post-Fordist' or 'neo-Fordist' perspectives. For them, as knowledge economy optimists, a more adaptable and better educated workforce is needed having new core skills, such as problem-solving, teamwork, communicative ability, creativity, initiative, and the capacity for learning (Lloyd and Payne, 2002).

Brown (1999) characterizes the knowledge economy optimists, searching for a high skills economy as follows:

> The study of 'high skills' has become synonymous with the search for 'post-industrial possibilities' - a new opportunity to reconstruct the social relations of the workplace, education system and society on the basis of high levels of ability, trust and greater equality for all (p. 247).

The most optimistic of the optimists is possibly Carnoy (1998) who argues that the transformation of work and employment has 'created the basis for reintegrating the individual into a highly productive, more egalitarian social structure (p. 124), which would lead to, 'greater wealth and leisure [….] and a [….] new set of reintegrative activities that make life more interesting and rewarding (p. 125).

In addition to the skill formation literature, there is also the work of business analysts such as Michael Porter who has argued that innovation is key to competitiveness through high value-added high skills products and services and that it is not only the preserve of high skilled economies.

As Porter (2000) writes:

> International competitiveness increasingly depends on innovation with continued operational improvement in education and infrastructure now a given, and with local companies all able rapidly to acquire and deploy technology from around the world,

> producing standard products using standard methods no longer sustains competitiveness (World Economic Forum Global Competitiveness Report .

An important parameter regarding Porters' view are clusters. Clusters are geographic concentrations of inter-connected companies, specialised suppliers, service providers, firms in related industries, and associated institutions. They are a fundamental economic unit in the modern economy and an important driver of competitiveness as they have a role in knowledge creation, innovation, the accumulation of skills, and the development of pools of employees with specialized expertise.

> Clusters also gain in importance as firms migrate from vertically integrated structures, in which they perform most activities internally, to structures involving the outsourcing of many activities and functions to outside entities (Porter, 2007, p.2).

The question for Cyprus is whether such clusters are possible to create.

However, these optimists are balanced by pessimists.

The Knowledge Economy Pessimists

Crouch *et al.* (1999) argue that high-skill sectors are only going to create a limited number of high-skill jobs. Also 'an important minority of the workforce will be unable to participate in the employment provided by the learning society' (1999, p. 238).
In the same line Finegold and Soskice (1988) used the term *low skill equilibrium* to denote a self-reinforcing network of societal and state institutions which interact to stifle the demand for improvements in skill levels. Essentially, they saw the UK's problem as one of systems failure, where UK individuals and employers react rationally to the incentives they face and end up in low rather than high skills equilibrium. It is about a broad set of structural, environmental and incentive system interactions, i.e. a complex policy problem, which cannot be solved by relatively straightforward policy interventions. This equilibrium is hard to shift, because it reflects a whole range of

underlying factors to do with the structure of domestic product markets, a highly de-regulated labour market, the prevalence of models of competitive advantage based on economies of scale, central control, cost containment, standardization and the structure of ownership, especially the importance of multi-nationals (MNCs).

Through the years the emphasis has shifted towards high skill eco-systems and learning regions. Finegold (1999) emphasizes that high skill regions or sectors can exist within otherwise relatively low skill economies. He also recognizes that the high skill/low skill equilibrium (HSEq/LSEq) concept is a rather static one. The focus on eco-systems, as opposed to equilibria, places greater emphasis on evolution and dynamics. He shows how particular enterprises have become successful due to their participation in self-sustaining eco-systems. As part of the way towards high-skills equilibrium, Finegold (1999) identifies four inter-related factors which have contributed to the creation of dynamic business eco-systems. First is the contingent catalyst which can trigger development. Second nourishment emanating from world-class research universities who have provided a stream of young talent. Third a supportive external environment including infrastructure is regulatory regime sympathetic to risk-taking. Finally inter-dependent relationships based on flatter hierarchies within enterprises together with local and regional networks.

While Finegold and Soskice (1998) can be seen as pessimists, Finegold (1999) at least opens the possibility that some businesses, even in a predominantly low skills economy can create high skilled work through the eco-systems constructed. One such, to be discussed, might be more high skilled forms of tourism in Cyprus.
To the ranks of the pessimists could now be added Brown, Lauder and Ashton (2011). They argue that far from the rhetoric of many government reports and the views of optimists there is now no need for mass higher education on economic grounds as the professional middle class is being divided into different kinds of knowledge workers. For them the global auction for skilled workers has led to the following trends or changes.

Firstly and against many predictions from orthodox economists and commentators like Reich (1991), the rise of mass higher education systems in East Asia has led to sufficient

highly skilled graduates to compete for jobs with those in the West. Moreover, the skill webs of transnational companies (TNCs) facilitates the movement of these jobs because these skill webs have intelligence and human resources systems to locate both suitable graduates and the work infrastructures to make them highly productive. The reason why TNCs interested in relocating highly skilled work to East Asia is because graduates there are far cheaper than in the West. In an earlier paper Brown and Lauder (2006) compare the salaries of software professionals in the United States with those in India in 1997. They show that a software developer in the USA commands a salary of between $49,000-67,500 while in India the salary range would be between $15,700 and $19,200.

This leads to the second trend which is that where in the past the West has had an advantage in innovation systems through the quality of their universities and graduates, thereby enabling graduates to earn a premium, that is no longer the case: there has been a quality price revolution in which high quality work can now be done at a fraction of the price in East Asia and the comparison of software developers shows.

Thirdly, wage costs can also be cut through the application of what they call *digital Taylorism.* Before proceeding to the views on digital Taylorism it is worth giving a brief background to Taylorism. Taylorism is the name of the approach to management and industrial and organizational psychology initiated by Frederick Winslow Taylor in his 1911 monograph *The Principles of Scientific Management*. According to Taylor the best way for the worker to do the job is to provide the proper tools and training as well to provide incentives for good performance.
Brown, Lauder and Ashton (2008) argue that:

> If the twentieth century brought what can be described as mechanical Taylorism characterised by the Fordist production line, where the knowledge of craft workers was captured by management, codified and re-engineered in the shape of the moving assembly line, the twenty-first century is the age of digital Taylorism. This involves translating knowledge work into working knowledge through the extraction, codification and digitalisation of knowledge into software prescripts that can be transmitted and manipulated by others regardless of location (p. 139).

There are significant consequences for education. Far from needing to encourage high levels of creativity, the levels required for the theory of the knowledge they describe tends to be more basic.

Brown et al. (2008) argue that:

> Digital Taylorism enables innovation to be translated into routines that might require some degree of education but not the kind of creativity and independence of judgement that is often associated with the knowledge economy. In order to reduce costs companies have to move from knowledge work to working knowledge; that is, from the idiosyncratic knowledge that a worker has and applies, to working knowledge, where that knowledge is codified and routinised, thereby making it generally available to the company rather than being the property of an individual worker (p.5).

However, while many professional workers may be seen as de-skilled by this process, there is a fourth trend relating to what is seen as the war for talent. According to the human resources managers they interviewed there is a war for talent. This war is due to the fact that there are only a few graduates, despite the massive increase in graduates coming onto the labour market, who are capable of playing a key role in the leadership of global companies. These graduates are described as having excellent technical skills in their particular field of study as well as being multilingual and multicultural (Lauder and Brown, 2009).

While these authors present a very different 'heterodox' view of the knowledge economy, they are not entirely pessimistic. In their concluding chapter they argue that active forms of state, which inspired industrial policy, may mitigate against some of these key trends for western countries. At the same time they also emphasise that while the West is in danger of losing these key professional jobs, East Asia gains. This note of optimism leads us towards what may be called the contingency theorists.

In looking at them, we need also to consider that much of the work of the contingency theorists was undertaken well before the writing of Brown, Lauder and Ashton (2011)

and this need to be born in mind when considering the application of the latter to the Cypriot situation.

The Contingency Theorists

I have called the following authors contingency theorists because they argue that whether there is an optimistic or pessimistic outcome to the changes in the global knowledge economy will depend upon the strategies that are adopted to raise the supply and demand for skilled workers. That cannot typically be left to the market as it may need state intervention.

In contrast to the optimists, contingency theorists have always acknowledged that the high skills route is not the only option. Ashton and Green (1996) wonder whether the rules of international competition have really changed so fundamentally that there exists only one viable *high skills* route to competitiveness and profitability for advanced capitalist economies. The low-skills, low-wage route to profitability remains a viable proposition for many companies and sectors in many countries.

Brown and Lauder (1996) analyze state responses with particular relevance to education. They argue that strategies for economic and educational development can be linked to different ideal type models of national development. Those are referred to as Fordist, neo-Fordist, and post-Fordist modes. Fordism refers to the standardized assembly-line model of mass industrial production that transformed industry in the first half of the twentieth century. According to Hodkinson (1997), it is a system of mechanized mass production of consumer durable goods characterized by a labor process based around the fragmentation of tasks and the assembly-line, operated by semi-skilled mass labor, and is derived from Henry Ford's approach to the mass production for mass consumption of automobiles early in the 20th century.

Fordism corresponded with the dramatic expansion of compulsory secondary education and mass tertiary education. Neo-Fordism emerged in the seventies and refers to the New

Right's commitment to markets, competition, and privatization i.e. Reagan and Thatcher approach. In terms of education policy, the key words are choice and diversity. The ideal situation is the establishment of markets of diverse competing institutions.

Neo-fordism and post-fordism has been distinguished and analysed by Brown and Lauder (1997) as two ideal typical models of national economic development. They categorised the change in terms of economic competition and production process, labour flexibility and organisational structure, politics and ideology and skill formation.

Brown and Lauder (1997) see flexibility aspects of neo and post-fordism so that they asserted that:

> "Neo-Fordism" can be characterized as creating greater market flexibility through a reduction in social overheads and power of trade unions; as encouraging the privatization of public utilities and the welfare state; and as celebrating competitive individualism. Alternative "post-Fordism" can be defined in terms of the development of state as a 'strategic trader' shaping the direction of the national economy through investment of human capital (p.176).

Here the education goal is to move toward a high skill, high wage society. More particularly:

> The creation of a post-Fordist economy will depend upon an active state involvement in investment, regulation and strategic planning in the economic infrastructure alongside a commitment to skill formation through education and training (Brown and Lauder 1996, p. 21).

For Brown and Lauder (1996), what we might call the global knowledge economy of the optimists is achieved through the nature of state activity and co-ordination. At this point is good to check the lessons can be learned regarding the conditions under which Cyprus might move to high skills, knowledge economy trajectory.

3.3 THE CONDITIONS FOR SUCCESSFUL STATE INTERVENTION

A comparison of skills upgrading in several fast-growing economies in Asia suggests that perhaps there is a model that can lead to upgrading-driven economic development. As Ashton and Green (1996) note:

> The East Asian solutions may be showing a model which is superior in economic terms for the current era. Even if that remains unproven, it remains the best available model for the rapid transformation of agrarian into industrialized economies and then to relatively high skill economies, which makes it of special potential for developing countries still approaching these stages (p.9).

Referring to Goodwin (1996), the basic features of development in Singapore have been the ability of ruling elite to establish a strong and efficient state bureaucracy which is independent of both capital and labor. Second, the ability of the elite to define the long term aims of economic and political activity. The basis for assessing national skill and training policy is based on the needs necessary to achieve the government's goals not the needs of employers. Third is the willingness of the political elite to intervene directly into education and training experiences of existing workers to improve their skills. Training in this instance is coordinated by the state to meet industrial needs. The last but not least is the linkage between education and training policy and the broader concerns of enhancing the general standards of living for all. The policies of the state require individuals to continually develop and the rewards for this are the improved standards of living.

From their study of the East Asian experience, Ashton and Green identify six main requirements for high skill formation. These are as follows (Ashton and Green, 1996, pp. 100- 104):

- The government must be committed to achieving high skill formation. For that reason the state should provide the educational system.

- The educational system must be effective. This is in order to produce future workers who would be in a position to develop their work-based skills further through the use of new technologies and innovative forms of production.
- Leading employers must be committed to skill formation as some types of skills are either difficult or extremely expensive to learn outside the workplace. The government has to encourage employers to be committed to skill formation.
- There must be some form of regulation controlling the process of skill formation at the workplace to ensure a long-term approach to skill formation.
- Workers must be motivated to participate in the process of skill formation, either as learners or as teachers.
- It has to be a system in which on-the-job training is complemented by off-the-job training in order to keep up to date with new technology.

When we focus particularly on education then there has been some helpful work undertaken by UNESCO (1993).

In that report it is argued that education and training are not ends in themselves. Their purpose is to contribute to the process of skill formation. For that reason certain conditions should be satisfied. UNESCO report (UNESCO, 1993, pp. 12-15) highlights the most important i.e.:

- Linking ET with the world of work. That is essential because it reduces the waste of resources spent on skills not required by the world of work, while much needed skills are not being considered. Developing and updating curricula should involve the economic sectors in order to respond to their needs.
- Integrating technical and vocational education into general education through the rapid development of technology. Technical and vocational education should not be kept as an isolated education process. It should be integrated into the general education system and should include the possibility of leading to higher education.

- ❖ Making technical and vocational education more attractive by increasing the awareness of students, parents and employers of the career potential for technical and vocational graduates; increasing employment opportunities; providing access to general and higher education.
- ❖ Training teachers by recruiting teachers from the world of industry improving the quality of teacher education and training, and periodically training teachers to update their knowledge and skills.

Can the contingency theorist's position be adopted in Cyprus? Here it will be argued that Cyprus is starting out on the road towards a high skills knowledge economy; that is has distinctive features as an island economy that both insulates it from major global forces while being vulnerable to others. Brown, Lauder and Ashton (2011) consider industrial policy as a possibility in raising the supply and demand for highly skilled workers. Based on this, the question is what the prospects for Cyprus are?

Here there are several subsidiary questions. Can we apply the template outlined by Ashton and Green (1996) to the Cypriot situation? If so how are demand and supply co-ordinated in Cyprus? What role does planning play in this process? What powers are employed by the state in order to develop a high skills knowledge economy trajectory? Have changes in educational policy been consistent with the changes argued for by UNESCO 1993? And finally how effective have state policies been both in education and in terms of planning and co-ordination?

It has to be said that these conditions are demanding. It does require forms of co-ordination that different interests groups may not have considered central to high skill formation. For example, employers may not consider incentives for learning to be central to their mission. At the same time, the goals of the Cypriot education system have traditionally been far more focussed on an education for national identity and citizenship than for the economy. However, when looking at these conditions it is reasonable to suggest that there must be an ideology that can bind these different parts of the skill formation system together, nationalism would be one such ideology. So it may be that

there is the potential in education of changing a nationalist ideology to one which emphasises education for the economy.

In the next chapter I will try to give a clear definition of skills in relation with the 21st century environment.

CHAPTER FOUR

THEORIES AND DEFINITIONS OF SKILL

How can a small country such as Cyprus maintain a high-wage, high-skill economy? It cannot compete with the low-cost economies of Asia, so it must, as a matter of economic survival to invest heavily in education and training. In order to address this question an account of theories of skills and their definitions has to be given. Finally this chapter discusses issues of policy. Especially, the issue of academic and vocational education and what policy conditions need to be present to develop a high skills economy.

According to Thomas Healy (1999), Principal Administrator Centre for Educational Research and Innovation (OECD), the questions for policy makers to answer are: How do we know which skills are important? How is knowledge and competence produced; what are the returns to knowledge and skills? How are skills distributed? What is the pattern of access to learning opportunities for different groups and regions? (p.1)

It can be argued that there are three theoretical approaches to understanding the relationship between skills and the economy: human capital theory, skill formation theory and what may be called Global Auction theory (Brown, Lauder and Ashton, 2011). Criticisms can be made of the first two of these theories, while the third is a challenge for Cyprus aspirations to become a high skilled economy. Once the theories have been outlined and commented on, the question of what is meant by skills will be examined. From this discussion a critical understanding of high skills policies in Cyprus can be developed.

In this discussion the focus is on developing a high skills economy. Brown and Lauder (2001) define such an economy as:

> A high skills economy is defined as an economy with a wide distribution of workforce skills where these are fully utilized to achieve high productivity across a wide range of sectors, at the same time producing high wage rates and relative income equality (p.2).

A high level of workforce co-operation supported by civic trust and social capital is also seen as an important part of the model (Green and Sakamoto, 2001, p. 64).

Brown and Lauder (2006) state that:

> The aspiration to develop a high-skills economy is based on the idea that if the demand and supply of skills can be raised, individuals and nations will gain because the returns to skill will make both better off. More skilled work should lead to greater individual satisfaction with work and greater stability and opportunity in finding work and staying employed (p.23).

Having provided an account of what is meant by a high skills economy I turn to a discussion of the theories.

Human Capital Theory

The economic role of education is the core focus of the human capital approach to education. However, as a Cypriot, for whom education has been linked to cultural and historical concerns, I have to admit as with many others, that this model is problematic regarding the aims of human life because:

> Human capital theory conceptualizes the world through the eyes and disciplinary lenses of contemporary mainstream economics, a discipline that has increasingly blocked out the cultural, social and non-material dimensions of life (Robeyns, 2006, p.72).

However, Throw (1970) explains that:

> In order to analyze man as a producer, some method must be found to measure and quantify his productive abilities. The idea of human capital is introduced into economic

> analysis to provide such a measure. Human capital is defined as an individual's productive skills, talents, and knowledge. It is measured in terms of the value (price multiplied by quantity) of goods and services produced. Since consumption is the ultimate goal of our economic system, the value of a man's human capital is the same as the value of the consumption goods and services which he directly or indirectly produces. When the value of goods and services rises, the value of human capital rises. When the value of goods and services falls, the value of human capital falls (p. 1).

In such a case human capital may be defined as skills and knowledge that enhance a worker's productivity in the labour market.

The first use of the term *human capital* in modern economic literature was by Schultz (1961). He classified expenditures on human capital as investment rather than consumption. Weisbrod (1961) developed a first conceptual framework for estimating the value of assets in the form of human capital. Capital values of people as productive assets are incorporated into an analytical function of sex, age, stock of human capital, etc. The present value of an individual **V(a)** at any given age **a** is defined as the sum of his discounted expected future earnings **Yt** (equal to the value of productivity):

$$V(a) = \sum_{t=a}^{\infty} \frac{P_{at}}{(1+r)^{t-a}} Y_t$$

Pat *represents the probability of an individual of age* ***a*** *to be alive at age* ***t*** *and* ***r*** *is the discount rate.*

I have presented the basic algebra relating to human capital theory because it looks imposing. However, there are questionable assumptions underlying the theory. Brown et al (2001) identify some of the key criticisms regarding this approach. First individual workers are reduced to a bundle of technical skills instead of being seen as human beings bound to social contexts through commitment, motivation, and the ability to learn how to learn. Second the human capital theorists assume a model of technological progression from low to high skilled. They also assume that human capital will create its own

demand. Thirdly, the impact of technology on employment is uneven as up-skilling, down-skilling and re-grading are taking place every day. So the upward demand for high skills work is questionable because there is no linear model from technological change to education, high skills, or high wages. Finally human capital theorists have an obsession with measurable outcomes, as we have seen above, ignoring the processes underlying the use, complexity, level, and learning of skills.

For the purpose of this thesis I shall identify some further key points of criticism.

Marginson (1993) presents three assumptions regarding human capital theory. The first is that education increase human skills and hence productivity. The second assumption is that the increased productivity results to higher individual earnings. The third assumption is that wages are determined by the marginal productivity of labour.

In turn, according to Becker (1975) education is seen to provide valuable skills, abilities and knowledge i.e. capital, that make workers more productive and, hence, more attractive to employers. The human capital theory assumes that employers will create the technologies and work conditions that will enable the workers with higher education qualifications to realize their productivity. In this way more education leads to greater productivity and both personal and national income.

However, human capital theory does not deal with a number of key points. It assumes equivalence in terms of educational qualifications, especially at the degree level. Borghans et al (2001) have the view that the link between skills (or indicators of educational attainment) and economic performance is far from automatic. The reasons can be first the equal investments in education can lead to different quantities of skills or to skills that differ in their market value. Second, the labor market does not always fully utilize the available skill. Third, education might be used by the labor market as a signal of ability rather than as a source of skills supply. This suggests that we should be skeptical about the links between education and educational qualifications and their relationship to skill.

Human capital theory can address elements of this criticism but not all. In particular, it has little to say about the content of education. Becker (1964) distinguished two types of skills, general skills having a productive value in many different firms and specific skills which a productive value in a particular firm. However, given that we are seeking to develop a knowledge economy, human capital theorists have had little to say about the nature of the general skills that could promote productivity. Becker also believed that specific skills should be left to the market and the initiatives of particular firms because they would know best what skills they required. But this assumes a system like that of America or Britain rather than one such as Germany where there is a much tighter link between the vocational education and training system (the dual system) and company training.

The reference to America and Britain, in relation to Becker's theory, is appropriate because these are economies that emphasise the individual and market relations rather than the kind of social relations which characterise the links between education and the economy.

It is with this thought in mind that I turn to skill formation theories.

Skill Formation Theory

Skill formation theory was initiated by Maurice et al. (1986) through their comparative analysis of skill formation in France and Germany. They argued that the way skills are constructed and utilised is different in different organisations and societies. In contrast to the human capital abstractions about the individual and education, these theorists emphasised the social construction of skills within particular national contexts. What their insights lead to is a question about how different societies may have contrasting routes to a high skills economy.

Thelen (1998) who has viewed the development of skill formation systems in historical context argues that:

> In pre-industrial economies, skill formation was traditionally organized and administered through the system of craft guilds. Masters presided over the training of apprentices, who advanced to journeymen status and strove to become masters themselves by acquiring skills and experience. This system came under great strain in the context of industrialization, and what mattered crucially to shop-floor outcomes is what happened in different countries as these traditional institutions broke down (p.25).

This approach to education, skill and the demands of the economy makes it much more complicated for policy makers because what is required is how best to organize the institutions and policies that will provide a route to a high skills economy. This is made even more problematic because in contrast to human capital theory there is no automatic demand for skilled workers, even if in this theory there may be time lags between the supply of such workers and the demand.

As Lauder et al. (2008) note:

> It is a fundamental tenet of skill formation theory that the production and demand for skills is dependent upon societal capacity, in particular it involves building the foundations of skill formation on complementary institutions underpinned by appropriate, political, cultural, social and economic norms and conditions (p.22).

Given the inherently social nature of skill construction and the rapid changes in economies, Heckman and Masterov (2005) argue that:

> Skill formation is a dynamic, synergistic process and these synergies must be tapped if a successful skill formation policy is to be crafted. Skill formation is a life cycle process. It begins in the womb and continues on in the workplace (p.2).

These dynamics can lead to major mismatches between the supply and demand for skills. Wolf (2002) writes that 'an unquestioning faith in the economic benefits of education has brought with it huge amounts of wasteful government spending, attached to misguided and even pernicious policies' (p. xi).

Mason (2002) makes a similar point as:

> At the same time increases in measured skills may have no effect on relative productivity performance unless those skills are well matched to employer requirements and are effectively utilised within enterprises (p.18).

There are examples of rapidly growing economies where educational spending has been low and of economies where relatively high educational expenditure has had little impact on growth.

Summarizing, Brown et al. (2001) argue that *Skill formation policy* differs from *Human Capital theory* in the fact that it draws on economic sociology and the new institutionalism (Crouch and Streeck 1997). *New institutionalism* focuses on developing a sociological view of *institutions* on how they affect *society*. *Economic sociology* is the sociological analysis of economic phenomena. The new economic sociology focuses on the economy in isolation from other social realms.

So far the analysis has focused on the descriptive and the explanatory account of a high skills economy but it should be noted that values should ideally also be included. For example, Etzioni sees the economy as a crucial part of contemporary society, but the normative standards by which its performance is to be judged cannot be the criteria of efficiency. The economy should be judged by its contribution to making the world a livable place by arranging the production of wealth in a way that does not jeopardize the realization of the values of justice, freedom and fairness. He argues that in order 'to be viable, the market mechanism of competition must be 'encapsulated' by social bonds and government regulation' (Etzioni, 1988, p. 199).

If skill formation theory draws attention to the importance of social relations and institutions for the social construction of skills and their supply and demand, then the issues relating to how to create a high skills economy are made even more complex by the advent of the knowledge economy and economic globalization.

The Global Auction for Skills

In their recent book, Brown et al. (2011) have developed a theory of the global auction for skills discussed in the previous chapter. We have seen that they argue that we cannot assume that high skilled work will remain confined to national boarders and that therefore the strategies for high skills can be considered only as a national project. Two features of their analysis make the position of policy makers more difficult. Firstly, the relative costs of graduates in East Asia means that a country like Cyprus cannot hope to compete on cost. Secondly, their discussion of digital Taylorism means that many of the more high skilled jobs that might have been anticipated in Cyprus are now becoming routinised. These jobs may require some skills in relationship to numeracy, literacy and IT skills but not the sort of skill imagined in terms of a high skilled economy.

Out of the discussion of these theories several points emerge. From the criticisms of human capital theory it follows that much more needs to be understood about the content of general and vocational education and its contribution to economic growth. Moreover, skill formation theory draws attention to the fact that the kind of equilibrium analysis assumed by human capital theory in which the supply and demand for skills can be expected to move to a higher equilibrium on the basis of improvements in education do not automatically follow. The key is how the social construction of skills within institutions and between educational and business institutions is linked and this then becomes a matter of strategy and planning.

However, this form of strategy and planning has been made more complicated by the global auction for skills. What it means for Cyprus is that competitive advantage in the development of a high skills sector of the economy must rely on economic conditions that

are unique to Cyprus. Tourism would be one example but the problem for tourism is that it is often seen as a largely low skilled form of work.

With these inferences in mind I now turn to the next question; what we mean by skills?

4.1. DEFINITIONS OF SKILL

When looking at how we can best understand the concept of skill, some pints need to be born in mind. The notion of skill changes as the nature of work changes. So for example, many qualities now associated with skill would previously not have been thought of as skills. And, where once craftsmen has a particular set of skills now the term has also come to mean the capability of extending these skills into new areas and developing new skills.

Proctor and Dutta (1995, p.18) in what is arguably the most authoritative text on skill acquisition and performance, define skill as goal-directed, well-organized behavior that is acquired through practice and performed with economy of effort. Each element of the definition is important: first, skill develops over time, with practice; second, it is goal-directed in response to some demand in the external environment; third, it is acquired when components of behavior are structured into coherent patterns; and finally, cognitive demands are reduced as skill develops.

While such a definition may be useful at a certain level of abstraction, it does not tell us anything about the way in which the concept of skills has changed. Payne (2000) argues with respect to the UK context that:

> Skill has expanded almost exponentially to include a veritable galaxy of 'soft', 'generic', 'transferable', 'social' and 'interactional' skills, frequently indistinguishable from personal characteristics, behaviors and attitudes, which in the past would rarely have been conceived of as skills. If the notion of skill has always perhaps been 'essentially indefinable', it is now both broader and more conceptually equivocal than it has ever

> been. Despite this, policy makers increasing insistence upon the salience of skills has not been matched by an appreciation of the problems that such a diffuse usage is likely to present in the realm of vocational education and training (VET) policy (p. 354).

Skills can therefore take different forms and presuppose different practices and actions. Referring to Employability skills for the future (2002, p. 8–9), skills can be *Communication* that contributes to productive and harmonious relations across employees and customers, *Teamwork* that contributes to productive working relationships and outcomes, *Problem-solving skills* that contribute to productive outcomes, *Self management skills* that contribute to employee satisfaction and growth, *Planning and organizing* that contribute to long-and short-term strategic planning, *Technology skills* that contribute to effective execution of tasks, *Learning skills* that contribute to ongoing improvement and expansion in employee and company operations and outcomes, *Initiative and enterprose* skills that contribute to innovative outcomes.

It can be argued that the expansion of the concept of skills has to do with changing workplace practices, especially with high performance workplaces in which workers are given the autonomy for teamwork and problem solving. Also planning and organizing in particular have become prominent (Ashton and Sung, 2002).

The difficulty with this expansion of the concept of skills is that many of these *new skills* like teamwork, modes of communication and problem solving will have a cultural element to them. These different cultures will have different ways of approaching the learning and acquisition of these skills. In the context of a small island like Cyprus this is particularly relevant since as we shall see in the discussion of the Cypriot economy there is now a significant group of migrant workers in Cyprus which may present the problems referred to here.

In addition, there is the dynamic element to the development of skills referred to above. As Wyn and White (2000) note:

> Today, the term ‘skill’ is in parallel route with the term ‘competency’ and has come to imply a post-Fordist neo-liberal notion of the attributes of the ‘new’ worker having the

> flexibility to change with workplace restructuring, the competence with new emerging technologies and finally the perpetual training and possessing 'transferable behavioral characteristics (pp.172–173).

It is for this reason that the question of competency alongside that of skill has been much discussed. As the authors below make clear, competency has at least two dimensions. The first is about being able to extend skills in application to the workplace and the second to have the ability to extend them and change them into the future as the workplace changes. Boon and Van der Klink (2002, p.6) state that competency is 'a useful term, bridging the gap between education and job requirements'. Prahalad and Hamel (1990) define competency as 'the collective learning in the organization, especially how to co-ordinate diverse production skills and integrate multiple streams of technologies' (p. 82). While Björnavold and Tissot (2000) define competence as 'the proven/demonstrated – and individual – capacity to use know-how, skills, qualifications or knowledge in order to meet usual – and changing – occupational situations and requirements'(p. 208).

However, how competencies can be taught or acquired, especially given that future orientation associated with competency, it is a further question. Cyprus has had a very traditional education system that has largely emphasized the academic and modes of formal teaching, especially in secondary education. The question is whether and in what ways the education has changed to allow for the learning and development of these skills.

4.2 THE PROBLEMS OF ACADEMIC AND VOCATIONAL EDUCATION

In the opinion of the ancients, education is the process of developing or perfecting human beings. If the ancients were asked whether education should be specialized, they would answer that is should be specialized only in that is should be conceived in terms of man's specifically human nature. They regarded as vocational education the training of the slaves, not the education of free men. This classical view of education has more or less been unchanged until the beginning of 20th century. John Dewey was the 'key' figure for that change. In *Democracy and Education (1916),* Dewey declares that merely vocational training is the training of animals or slaves. It fits them to become cogs in the industrial machine. At the beginning of the industrial revolution, the English economist Adam Smith advocates a minimum general education for all citizens. He points out that a man who is incapable of using his intellectual faculties properly is not fully human. Specialized vocational training which does no more than fit a man for a limited task in the industrial process is as stultifying as the job itself. It contributes to the production of material goods, not to the development of human beings. In our days there is the view that all men should be citizens, that all have an equal right to the pursuit of happiness, and that all should be able to enjoy the goods of civilization. Under these circumstances a democratic society must provide liberal schooling for all.

However, in many societies vocational education still carries the implication of being second rate or only for those that will engage in low skill low paid work. Al-Masri (1999) argues that social status of vocational education is influenced, to a great extent, by the type of relation and nature of channels that link it with higher education that leads to the preparation of professionals. He also insists that the social status of vocational education in any society is, to a great extent, a reflection of the status of work values in that society. Traditional cultures and philosophies range between two extremes regarding their assessment of work values. At one extreme, the ancient Greek culture viewed work as a low-grade life activity that, nevertheless, can't be dispensed with; while at the other extreme, the Marxist culture viewed work as the supreme value. Between these two extremes, different cultures vary to some extent in their assessment of work values. A

balanced approach can be realized if work activities are assessed both by their material and economic returns on the individual and society, as well by the social and humanizing influences.

However, in the UK Macrae *et al.* (1997) argue that the academic-vocational divide remains class divided: that general education options are taken by more privileged students, and VET courses more by disadvantaged students, historically segmented on class and gender lines.

They said that the key question is how this academic-vocational divide can be overcome since there are positive aspects to vocational education. Leney and Green (2005) observe that:

> VET is commonly expected to contribute to positive economic, labor market, social and individual outcomes in the drive to achieve a high-skills economy and learning societies in Europe. For many young people VET is the way to progress from schooling to the labor market or, increasingly, to further education or training. For many workers, it should be an accessible way to improve performance and progression at work, to develop their skills and improve their adaptability to changes in work organization and technology. For enterprises, VET is a mean of raising productivity, improving skills and modernizing work practices. Governments see VET as a means of improving competitiveness, employment levels and growth through an enhanced and flexible skills base, and also as a means of raising levels of education and social cohesion more generally (p. 261-262).

Arguably, the key question is how we can integrate vocational education, as a part of general education, in 21st century. It is quite interest to see how this question was approached in the last century. Lazerson and Grubb (1974) state that:

> Manufacturers demanded that schools teach basic industrial skills and sponsored machine training and industrial art. Technical educators sought to improve the practical training of engineers and future industrial leaders. Pedagogical reformers saw hand learning as part of a broader movement to invigorate classroom teaching. Those concerned about cultural

> standards hope that drawing and craft instruction would restore the ideal of the skilled artisan, while social reformers turned to manual education to teach traditional moral values and bring together a disrupted industrializing society (p.3).

The question then is how this idea can be given new life in the 21st Century and in Cyprus. The Joint Interim Report of European Council and Commission (2002) identified a number of levers and priorities for reform in key areas, to make European education and training systems a world quality. The necessary reforms and investment should be focused particularly on the image and attractiveness of the vocational route for employers and individuals, in order to increase participation in VET. It has to be concentrated in achieving high levels of quality and innovation in VET systems for the benefit of all learners.

In Europe, there have been many attempts to adjust and reinvigorate VET as will be seen in the table below. The following table, taken again from Coles work (2004, p. 21), presents the different reforms in selected European countries:

TABLE 2: Classification of reforms to learning and learning environments

Change	Aims of change	Examples
Create additional new Institutions	Concentrate expertise, Diversify VET provision, attract students, meet skills need.	Austria and Portugal
Blend existing learning environments into a new kind of provision	Produce more effective programs, shift control of training to employers, tailor courses to meet skills needs.	Ireland, UK and Portugal

Engage social partners in planning and management of provision	Innovate in program design (focus on learner), coordinate range of existing provision.	UK, Spain and Portugal
Develop the school curriculum and assessment and qualifications	To make curriculum relevant, assessment authentic, recognize informal learning, motivate learners, bridge initial education and work situations.	Sweden, Finland, the Netherlands, Denmark and Ireland
Improvements in the content and teaching of specific programs in an existing type of institution	Work force development, drive up productivity through deployment of new skills, improve progression opportunities to work and in work	Denmark and UK
Develop teaching approaches to motivate and retain learners	Reduce exclusion from work and costs of benefits	Ireland

4.3. A POLICY FRAMEWORK FOR DEVELOPING A HIGH SKILLS ECONOMY

Following on from the previous discussion there are two aspects to the development of a policy framework. The first concerns the education and skills that may be seen as desirable and the conditions under which they can be developed. While the second concerns the approach by government, employers and workers to high skills formation.

The Conditions for an Education for a High Skills Economy

Ritchie (2005) argues that:

> Skills development has always been a bedeviling challenge because it requires society to create sources for both supply and demand. On the supply side, investment must be made in brick and mortar infrastructure; teachers must be trained; incentives must be provided for firms to train; and mechanisms must be implemented to monitor and enforce standards of skills formation (p. 15).

Based on this observation Tickly (2003) suggest some key elements of a skills development strategy summarized as follows:

- *A core vision* involving elements of a lifelong learning approach that have been tailored to local needs and contexts.
- *A proactive approach on the part of the state* to skills development as the state must work to facilitate and catalyze the development of processes that will result in a coherent skills development strategy and must play a leadership role, in partnership with key stakeholders in identifying and implementing skills development priorities.
- *A 'joined up' approach to policy making* in relation to existing and future policy frameworks relating to poverty alleviation, economic development, human resource development policy, education and training, trade and industry, labor markets, industrial relations etc.

- *The identification of suitable intra-government structures* to provide coherence and communication across sectors in relation to identifying and implementing skills development priorities.
- The identification and implementation of *appropriate mechanisms and tools for assessing skills development* needs in the formal and informal labor markets and in relation to future development priorities.
- Ensure that the principles of *good governance* are applied and are adhered to in relation to skills development, e.g. all relevant stakeholders need to be included in policy making; capacity for implementing skills development priorities needs to be developed in the state, the private sector and civil society.
- Harmonize external forms of support for education and training in terms of a *sector wide approach* to funding.
- *Develop a balanced approach to education funding* that seeks to meet the international development targets but also one that broadens the definition of basic education to integrate elements of vocational training and targeted support for secondary and tertiary education in key areas such as science and technology.
- *Put in place an ICT strategy* that identifies and seeks to implement skills develop priorities within this field.
- *Identify key priorities for the education and training sector to address* management and leadership capacity; mainstreaming gender issues; reviewing the provision of VET; curriculum reform at all levels; greater emphasis on ICT in education; the development of national curriculum and qualifications frameworks.
- Develop a *program of research and consultancy* to support the development of a skills development strategy. This ought to involve building capacity for indigenous researchers and consultants.

This list shows that education and training need to be seen within the wider context of policy formation that bridges education and the economy. As Kraak et al. (2006) express it:

> Joining up is essentially an argument about the necessity for educational reforms to interlock with macroeconomic, industrial and labor market reforms so that their

> combined impact has a better chance of meeting the new conditions for global competitiveness – the attainment of high - quality manufacture through a highly skilled and highly productive workforce. This view of policy and planning sees educational reform as constituting one component of a necessarily larger set of socio-economic reforms (p.6).

However, it is important to consider that:

> High skill formation depends on the creation of a positive-sum game that offers the educational foundation required for high skilled employment to all rather than a few. This is best achieved based on *meritocratic* rather than 'market' models of educational competition (Brown, 2001, p. 52).

With these desirable conditions in mind and also the political economy conditions of Ashton and Green discussed at the end of the previous chapter, we have now outlined some of the key conditions regarding the path Cyprus has to follow in order to achieve the aim to enter the world of a High skill knowledge economy.

PART 2

Presentation of Cyprus educational system, training, economy and labour market

CHAPTER FIVE

THE EDUCATIONAL SYSTEM

In addition to the previous general issues there are more specific challenges facing the education-economy relationship in Cyprus. These are, first the background of the Cypriot education system and its relationship to the economy. Second the challenges facing Cypriot education through the entry to the European Union and the increased rate of migration.

The education service in Cyprus is highly centralized. The Ministry of Education and Culture controls the curriculum, the textbooks and the other resources needed to deliver it. Local school boards are funded by the Ministry and their role is restricted to matters of building, maintenance, and supplies. Schools are directly controlled by the Ministry via the inspectorate and the school head-teachers, the latter having less devolved responsibility than in many other educational systems.

The educational system of Cyprus has been influenced by the educational systems of Greece and Britain. Their impact is obvious in the organization and administration of education, the curriculum and the school textbooks. Persianis (1996) states that:

> Two generalizations that can be made about the colonial education policy in Cyprus are that it was an elusive 'adapted education' policy and that it can, to a great extent, be described as the product of the colonial government (p.46).

The broad principles governing Cypriot education are:

- Education must constitute part of the wider socio-economical, cultural, and traditional characteristics, and values of Cyprus, which should be transformed successfully into educational objectives.

- Education should have internal and external coherence, an educational planning system and a democratic structure of educational administration.
- There should always be a strong link and mutual influence between education and life (Ministry of Education, 1996).

The structure of the Cypriot educational system is summarised in the following chart 1.

One of the main characteristics of the educational system in Cyprus is that its administration is centralized and both primary and secondary schools are considered as government, and not as community institutions. The maintenance of the centralized system has historical and political origins (Kyriakides 1999). On the other hand a decentralized system in a small country like Cyprus would be very demanding in manpower.

Referring to chart 1 (an outline of Cyprus educational system, p.59) the following data are obtained.

Public secondary education (where I will concentrate in this thesis) offers a six-year programme of instruction for children aged twelve to eighteen. Having a general education orientation, it is compulsory for the first three years until children reach their fifteenth birthday. In the last three years, it follows a more flexible and diverse orientation, catering to individual inclinations, aptitudes and interests. Attendance is compulsory for the successful completion of graduation requirements.

Primary education is compulsory and it has a six - year cycle. According to the Ministry of Education Annual report 2008, its population is about 64,761 pupils with education enrolment rate 100%.

During the school year 2006 - 2007 (Ministry of Education Annual report 2008), 27.530 pupils attended the Gymnasium, 23.242 pupils attended the Eniaio Lykeio (Lyceum) and 720 pupils the evening school with education enrolment rate 97%.

The philosophy underlying public secondary education is two-fold:

a) The dissemination of knowledge with emphasis on general education and a gradual transition to specialisation in order to prepare students for an academic, professional or business career.

b) The development of a sound, morally refined personality in order to provide society with competent, democratic and law-abiding citizens

(Ministry of Education, 1996).

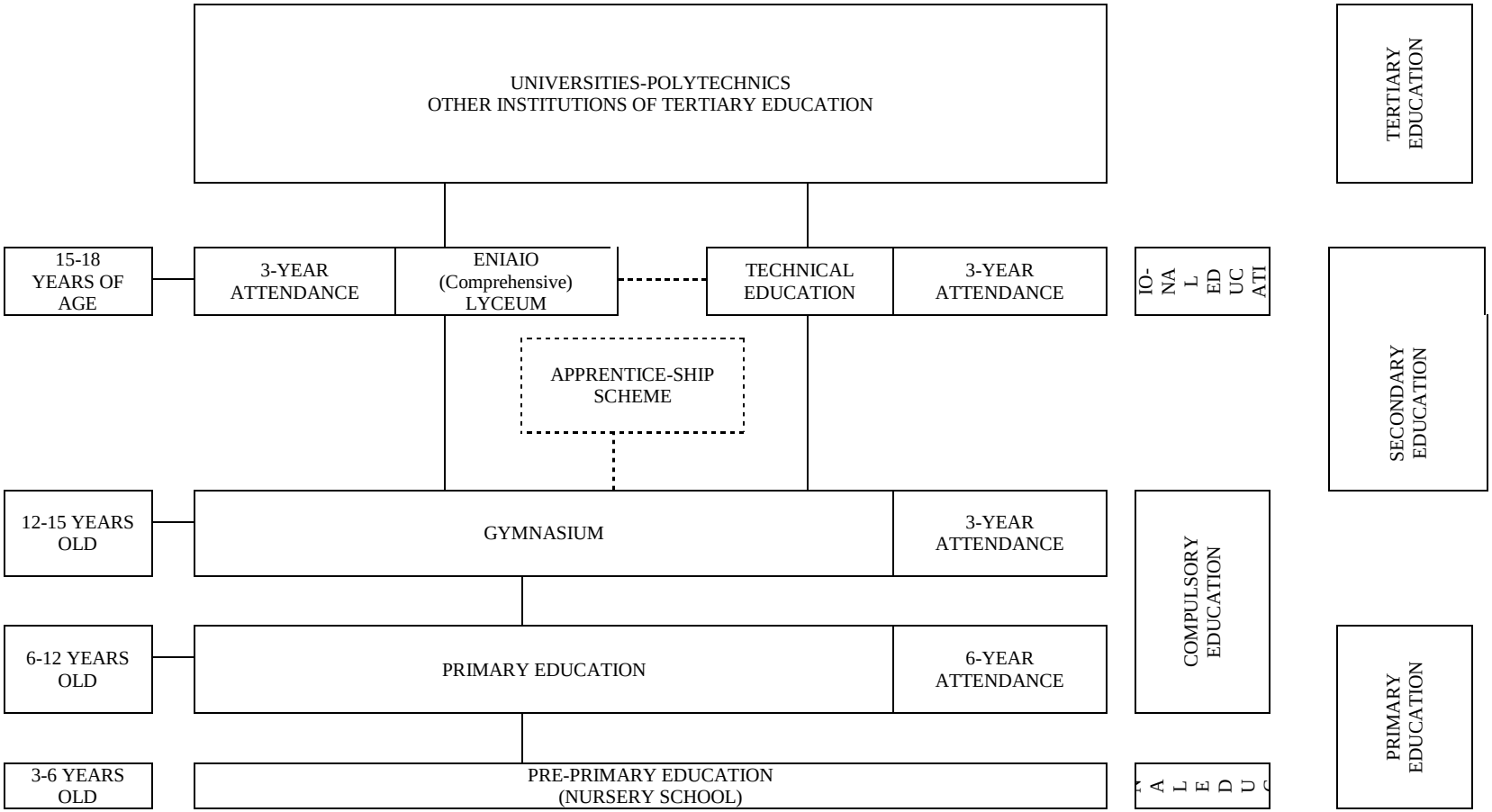
There has been a growing interest in linking secondary schools with the business world in an effort to provide students with an opportunity to experience actual work conditions in the field of their interest. A pilot project initiated in 1986/88 to accomplish this objective has been adopted with success: seventeen year-old students in the second year of Lyceum (upper secondary school) work for one week in a factory, firm, office, bank, hospital or other establishment of their choice.

Secondary Technical and Vocational Education represents about 21% of the total student population of the upper Secondary Education (ages 15-18 years old) i.e. 5794 students. It is offered to students who graduate from the Gymnasion at the age of fifteen and have elected to follow either the Technical or Vocational stream of Secondary Technical Education. The main difference between the Technical and Vocational streams is that in the syllabus of the technical stream more emphasis is given to science subjects, while in the syllabus of the vocational stream the emphasis is given to technological subjects, workshop practice and industrial training.

Upon completion of their studies, which have duration of three years, graduates of the technical stream may be employed by industry as technicians, while those of the vocational stream may be employed as crafts people (it has to be considered that the majority of students, up to 90% who follow the vocational stream, are boys). Graduates of both streams may also proceed to further studies at tertiary Educational Institutions in Cyprus or overseas.

The Cypriot system requires no entrance examinations for primary and secondary schools. Almost all primary school students are promoted to the next grade. Only in the first grade is there a failure rate of about 1.5 percent of the students. Primary school students earn a leaving certificate at the end of the sixth year after evaluation through continuous assessment. All primary graduates proceed to secondary school without any examination. In secondary education, every student receives a school report three times a year at the end of each school term. Also all the students take common exams.

CHART 1: 'THE CYPRUS EDUCATIONAL SYSTEM'



Higher Education

Higher Education in Cyprus is provided by the public and private higher education institutions operating under the various legislation frameworks. This legal framework outlines the overall policy for the Higher Education system of Cyprus which governs among others the operations of the Cyprus Council for Educational Evaluation-Accreditation (Symvoulio Ekpedeftikis Axiologisis-Pistopiisis SEKAP) and the Cyprus Council for the Recognition of Academic Qualifications (Kypriako Symvoulio Anagnorisis Titlon Spoudon KYSATS). The Higher Education sector in Cyprus has developed relatively late, during the last two decades, with the result that today more than 50% of the Cypriot students study abroad, typically in Greece, UK and USA. On the other hand many international students attend programs in Cyprus, mainly in the Private Institutions of Higher Education. As a general rule of the higher education system follows the efforts to establish the European Higher Education Area through the Bologna process and the three cycle degree system is already applicable. In an effort to upgrade its higher education system, Cyprus has obtained two new public universities and three private universities. These measures support, in various ways, lifelong learning activities. The development of the National Lifelong Learning Strategy 2007-2013 constitutes a commitment towards the E.U. which Cyprus has undertaken in the framework of the Lisbon Strategy and the National Program for Education and Training 2010. Cyprus vision for lifelong learning is the development of a system which ensures that all individuals will be motivated and supported and will be provided resources as well as the time to participate in training activities with the purpose of creating a society in which all citizens will contribute to the reinforcement of productivity, innovation and competitiveness of the country.

Following a proposal by the University of Cyprus, in line with the decision of the Ministers of Education in Berlin 2003, there is an ongoing discussion for the establishment of a National Quality Assurance Agency. Another draft law which is in front of the Government Legal Service, for the necessary legal scrutiny, requires the use of the European Credit Transfer Units (ECTS) in the description of the program outline and the issue of the Diploma Supplement to the graduates.

The development of a European Qualifications Framework (EQF) (European Commission, 2006) is another important factor to be considered. It intends to serve as a mechanism enabling comparability between national qualification systems and thus enhancing transferability and mobility of labor. Müller and Wolbers (2003) distinguish between occupation-oriented systems (e.g. Germany, Austria, and the Netherlands) and those which are focused on general, school-based education (e.g. the UK and France).The aims of the European Qualifications Framework (EQF) is transferability and comparability based on key terms such as 'qualification', 'knowledge', 'skills', 'competence', and 'learning outcomes'. National qualifications systems are a fundamental component of education and training provision. OECD evidence identifies economic pressures as a driver of reforms to national qualifications systems. Countries reinforce a need to strengthen the link between the education system and the labour market. In many cases as in Cyprus, there is a gap between job training needs and qualifications. This is a good reason for the development of qualifications frameworks and skill standards. Coles (2004) states that:

> This could include: defining the outcomes of a national curriculum; the process by which skills needs of sectors and the national economy are identified and classified; the description of national levels of education competence based standards for occupations and with this the development of competence based training and qualifications (pp.4-5).

The structure of Tertiary education, as mentioned earlier, is provided by three different types of institutions:

A. <u>Universities</u> *(Panepistimio)*

The dominant player is the University of Cyprus offering undergraduate programs with duration of 4 years and leading to the award of the *Ptychio.* The postgraduate programs of study at the Masters level have duration of 1 to 2 years**.** The postgraduate programs, at the doctorate level, extend between 3 to 8 years and lead to the award of the qualification: *Didaktoriko Diploma* (Doctorate of Philosophy, PhD).

The Open University of Cyprus accepted its first students in September 2006 in the areas of Health Care Management and Education Studies. The Open University of Cyprus is a State Institution of Higher Education that offers undergraduate and graduate courses, as well as training and vocational programs using a certain style of learning which is called open and distance learning, the purpose of which is to satisfy the demand for lifelong learning and continuing education.

The Cyprus University of Technology opened in September 2007 with the faculties of Geotechnical Sciences and Environmental Management, Economics and Management, Applied Arts and Communications, Engineering and Technology, Health Sciences.

B. <u>Public Institutions of Higher Education</u> *(Dimosies Scholes Tritovathmias Ekpaidefsis)*

Seven public institutions of higher education offer vocational programs of study. The qualifications awarded vary depending on the length of studies i.e. the Hotel Institute. The Hotel Institute mainly aims at supplying the Hotel and Catering Industry with properly trained and specialized staff and developing the broader tourist industry in general. Tourist industry is one of the most dynamic areas of economic development in Cyprus.

C. <u>Private Institutions of Higher Education</u> *(Idiotikes Scholes Tritovathmias Ekpaidefsis).*

Private Institutions of Higher Education, offer a wide range of academic (university level) programs as well as vocational programs of study. The establishment and operation of Private Universities, either of a profit or non-profit character, is stipulated by the provisions of Law 109(1) of 2005 approved by the House of Parliament of the Republic in July 2005. Four private universities have been founded in the Republic of Cyprus. These are European University, Frederic University, University of Nicosia and Neapolis University.

TABLE 3: Tertiary Education

Έτος και φύλο	Πανεπιστημιακά ιδρύματα University institutions				Μη-Πανεπιστημιακά ιδρύματα Non-University institutions				Γενικό σύνολο Grand total		Year and sex
	Δημόσια Public		Ιδιωτικά Private		Δημόσια Public		Ιδιωτικά Private				
	Φοιτητές Students	Από τους οποίους ξένοι Of which foreigners	Φοιτητές Students	Από τους οποίους ξένοι Of which foreigners	Φοιτητές Students	Από τους οποίους ξένοι Of which foreigners	Φοιτητές Students	Από τους οποίους ξένοι Of which foreigners	Φοιτητές Students	Από τους οποίους ξένοι Of which foreigners	
2003/04 Σύνολο	**4.110**	**295**	**0**	**0**	**2.070**	**40**	**14.669**	**6.344**	**20.849**	**6.679**	**2003/04 Total**
Άντρες	1.063	114	0	0	1.198	27	8.598	5.077	10.859	5.218	Men
Γυναίκες	3.047	181	0	0	872	13	6.071	1.267	9.990	1.461	Women
2004/05 Σύνολο	**4.532**	**316**	**0**	**0**	**1.938**	**33**	**13.608**	**4.552**	**20.078**	**4.901**	**2004/05 Total**
Άντρες	1.170	125	0	0	1.005	27	7.461	3.204	9.636	3.356	Men
Γυναίκες	3.362	191	0	0	933	6	6.147	1.348	10.442	1.545	Women
2005/06 Σύνολο	**4.861**	**377**	**0**	**0**	**2.014**	**42**	**13.712**	**5.211**	**20.587**	**5.630**	**2005/06 Total**
Άντρες	1.376	158	0	0	989	32	7.751	3.990	10.116	4.180	Men
Γυναίκες	3.485	219	0	0	1.025	10	5.961	1.221	10.471	1.450	Women
2006/07 Σύνολο	**5.340**	**476**	**0**	**0**	**1.812**	**39**	**15.075**	**5.446**	**22.227**	**5.961**	**2006/07 Total**
Άντρες	1.648	200	0	0	1.025	32	8.417	4.208	11.090	4.440	Men
Γυναίκες	3.692	276	0	0	787	7	6.658	1.238	11.137	1.521	Women
2007/08 Σύνολο	**6.144**	**671**	**7.823**	**875**	**1.636**	**25**	**10.085**	**6.182**	**25.688**	**7.753**	**2007/08 Total**
Άντρες	2.029	317	3.706	447	956	20	6.402	4.977	13.093	5.761	Men
Γυναίκες	4.115	354	4.117	428	680	5	3.683	1.205	12.595	1.992	Women

Source: Cyprus Statistical office (2008)

From the above table it can be seen that about 25,688 students study in Cyprus. If in this number is added the students studying abroad then it follows that there is a significant proportion of Cypriot higher education qualification holders.

5.1. CYPRIOT EDUCATION AND THE INFLUENCE OF THE EU

According to Angelides and Leigh (2004, p. 249) the accession of Cyprus to the EU raises many questions regarding the situation of its education system in comparison to the other Member States.

Souto-Otero *et al.* (2008) argue that European Commission has often been willing to take the role of expert bureaucrat to ensure a stronger position in educational policy-making. As

with national governments, the EU has a budget and the capacity to fund activities it considers beneficial.

Philippou (2010) has the view that:

> The EU invoked to justify and legitimize educational reform towards a globally competitive, knowledge-based economy … *Europeanisation* as an exemplification of globalisation thus seems divided. On the one hand ecumenical values pointing towards a humane and democratic school against ethno-nationalism with a clear vision for social change and social cohesion as aspects of European citizenship and identity. On the other hand, and in parallel, discourses of efficiency, competitiveness and knowledge-based economies necessitating an appropriate education seem to compete with the former goals and especially, in the context of Cyprus (pp.12-13).

The European Union has a role in policy making by setting relevant guidelines and policy priorities and Cyprus is preparing new programs as envisaged by the European Council in order to advance the targets set out in the Lisbon strategy.

The Lisbon Council of March 2000 launched a strategy, with the objective of making the European Union (EU) the most competitive and dynamic knowledge-based economy in the world. In the European Union (EU), the reform of skill formation systems has been advanced by the Lisbon strategy. The Bologna (1999) and Copenhagen (2002) declarations in higher education (HE) and vocational education and training (VET), respectively, have articulated such overarching goals in European skill formation. The Lisbon Strategy creates the platform for increased investment in human capital and a successful response to the globalization challenge.

In terms of education in Cyprus, there are two immediate influences. The first is the initiation of a National Qualifications Framework and the second is the impact of the Bologna Process on higher education degree structures. However, the Cyprus educational system is a double system of values. On one hand, there is an emphasis on practical needs for economic development, which it is supported by EU. On the other hand, the educational

paradigm of the island supports the national ideologies of *encyclopaedism*, *humanism* and the *Christian Orthodox epistemology*, promoted by the Church and Greece. According to Karagiorgi (2000):

> These dominant epistemological traditions often prevent the production and application of new knowledge. "Encyclopaedism" is based on the premise that education should include all human knowledge, so educational content is mostly academic. "Humanism" asserts that the ultimate goal of education is knowledge, independent of the personal experience. The Christian Orthodox epistemology, in a similar way, promotes religious respect to theory rather than action (p. 4).

The only exception in this 'climate' was the former Minister of Education Dr. Chrysostomos Sophianos (1977) stating that the basic aim was to contribute with education to the overall progress of the Cyprus's society. Dr. Sophianos maintained that the economic progress was a basic necessity for general social progress and whereas on the one hand he admitted that the education of a nation could not merely save its economy, on the other hand, he held that the educational system must, on no account, ignore the needs of Cyprus's economy.

The last decade, the basic directions of Cyprus education are in a transition stage. The entrance in the European Union requires to narrow the ethnocentric elements of the education and give priority to knowledge economy spectrum. For that reason there are reforms in process to the Cyprus educational system which will be discussed in Chapter 6.

At this point I will try to examine in depth the training system in Cyprus since this is the Achilles heel of the problem of transforming the traditional conception of education and its values to one which addresses the connections between the education system and the economy.

5.2. THE CYPRIOT TRAINING SYSTEM

The training system of Cyprus evolved within the framework of the socio-economic system described in the previous sections of this work. The main factors affecting the development of the training system of Cyprus were the changes in the industrial structure, the industrial relations system and the educational system. Although other factors did affect the utilization and development of human resources issues they tended to play a secondary role.

It is important to have in mind the view of Cairney (2000b) that:

> The central concern of the knowledge based economy is the need for modern industrialized nations to adopt a high skills and knowledge driven approach to economic development competitive strategy […] this will involve occupational restructuring as well as skill and knowledge changes within existing occupations. As well, it will be associated with changes in the structure of firms and the way they relate to other customers and competitors (p.32).

The Cypriot training system is characterized by three features. First, it aims to cater for both the employed and the unemployed by creating a flexible labor force with as the foundation on which the development of the economy can be based. Second, there is a form of central intervention which structures the system and provides permanent guidance as to the direction and the quality of training initiatives. This approach is similar to that of other countries, such as Singapore, whereby the education and training system has a dual function of providing the skills required for industrial development but is also used as a tool for nation building. Third, the system aims at increasing the involvement of individual employers in training.

The purpose of the training system of Cyprus is to create the conditions for the systematic development of the human resources of the nation, at all levels and in all sectors, in order to meet the economy's needs, within the overall national socio-economic policies. The methodology used has the following characteristics: the continuous assessment of training needs, the formulation of an integrated training policy, the maintenance and up-dating of the training infrastructure and the provision of professional assistance.

A strategic aim for Cyprus, relating to education and training, is the development of a system which will improve the links between initial and continuing vocational education and training. That might be achieved through the development of an integrated national system of academic and vocational qualifications.

There are several ministries and organizations responsible for the policy development and the implementation of measures in the field of education and training and economic development. The main actors are the Planning Bureau, the Ministry of Education and Culture (MOEC), the Ministry of Labour and Social Insurance (MLSI) and the Human Resource Development Authority (HRDA).

The Planning Bureau of the Cyprus government is responsible for the Strategic Development Plan (SDP), which sets the overall policy and targets for the development of the Cyprus economy, including human resource development.

The MOEC has the overall responsibility for the development of educational policy and its implementation, the administration of public and private education and the enforcement of education laws.

The MLSI is responsible for the preparation of the National Action Plan for Employment of Cyprus (NAP) with the support of the permanent NAP Committee of Cyprus.

The HRDA, a semi-government organization whose mission is to create the necessary prerequisites for the planned and systematic training and development of the human resources of Cyprus, sets its priorities and targets based on the government socioeconomic policy and strategic goals.

The following table summarizes the role of each body regarding Cyprus situation.

TABLE 4: Administrative bodies and their spectrum of action

ACTOR	RESPONSIBILITIES
Planning Bureau	Coordinating, policy-making body
Ministry of Education and Culture	Overall responsibility for education
Ministry of Labour and Social Insurance	Labour and human resource development matters
Human Resource Development Authority	Planned and systematic training and development of the human resource

The overall objectives of the employment policies in Cyprus concentrate on enhancing the conditions of full employment, improving quality and productivity at work and strengthening social cohesion. The achievement of the above objectives requires an effective tackling of the major challenges confronting Cyprus. The national targets in relation to the European Employment Strategy have been set as follows:

- Increase the overall employment rate to 71% by 2010
- Increase the employment rate of women to 63% by 2010
- Increase the employment rate of older workers to 53% by 2010

In Cyprus, the agency responsible for the forecast of manpower needs is the Human Resource Development Authority (HRDA) with input from the Planning Bureau of the Ministry of Finance and the Cyprus Statistical Service. Its general approach to forecasting has been influenced by the models followed in other countries, notably Finland, the UK and the Netherlands. In Cyprus, the HRDA forecasts total employment by sector (44 sectors) and occupation (27 occupations) but it also goes further than that to calculate the gross requirements of 90 mid-level occupations and 104 high-level occupations. It is not clear

whether it is possible, given data availability, to calculate ‘wastage’ at the fine occupational level, taking the existing age structure into account.

In the next chapter I will consider the economic and labour situation of Cyprus.

CHAPTER SIX

THE CYPRIOT ECONOMY AND LABOUR MARKET

Cyprus' economy is small, open and flexible. High employment rates economic growth and high levels of educational attainment are the main characteristics. In the last two decades the labour market has faced labour shortages leading to the need for employment of foreign workers, particularly in unskilled or low skilled occupations, as well as an increasing number of Turkish Cypriots. In 2007 foreign workers, including EU-27 nationals, represented around 21.7% of total employment (Cyprus Statistics Office Report, 2007).

In part this recruitment is reflected in the nature of the Cypriot economy. According to Eurostat, there are around 420,000 enterprises in Cyprus, with 99.8% of them being SMEs providing 83.5% of total country employment. A basic characteristic of Cypriot SMEs is that the vast majority of them pertain a traditional character, most of them being family businesses where family members work in the enterprise. Sectors with a high density of SMEs are whole-sale and retail, construction, manufacturing, hotels and restaurants, real estate, renting and business activities.

Let's take the 'story' from the beginning. After independence, in 1960, the Cypriot economy focused on exporting minerals, agricultural and consumer products. In the 1980s – 1990s, the island became an international centre of tourism and services. The high standards of transportation and telecommunication, as well the excellent living conditions, make Cyprus very attractive to foreigners. The following table presents economic activity per sector.

TABLE 5: Gross Domestic Product by sector

Sector	**1995**	**2000**	**2005**	**2007**
Primary	4.8%	3.9%	3.4%	2.9%
Secondary	22.5%	18.8%	18.8%	18.3%
Tertiary	72.7%	77.3%	77.8%	78.9%
Total	100.0%	100.0%	100.0%	100.0%

Source: Cyprus Statistic office (2007)

Primary sector: Agriculture, hunting and forestry, Fishing, Mining and quarrying.

Secondary sector: Manufacturing, Electricity, gas and water supply, Construction

Tertiary sector: Wholesale and retail trade, Hotels and restaurants, Transport, storage and communication, Financial intermediation, Real estate, renting and business activities, Public administration and defense, Education, Health and social work, Other community, social and personal service activities, Private households with employed persons, Extra-territorial organisations and bodies.

The above table shows that year by year the economic activity in Cyprus has been increasingly concentrated on the services sector, in a rhythm comprises 80% of GDP. The basic characteristics of the Cypriot economy are the dominant role of the private sector in production, the small size of the domestic market and the limited labor force available.

TABLE 6: Economic Activity by sector (*Source: Cyprus Statistical office 2009*)

(Χιλιάδες-Thousand)

NACE Αναθ. 1.1	Κλάδος Οικονομικής Δραστηριότητας	Αριθμός Εργαζομένων Employed Persons								Division of Economic Activity
		2001	2002	2003	2004	2005	2006	2007	2008	
A.	Γεωργία, θήρα και δασοκομία	30,6	30,1	31,0	30,9	29,1	27,7	26,3	25,3	Agriculture, hunting and forestry
B.	Αλιεία	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3	Fishing
C.	Ορυχεία και λατομεία	0,6	0,6	0,6	0,6	0,5	0,5	0,6	0,6	Mining and quarrying
D.	Μεταποιητικές βιομηχανίες	35,7	35,2	35,4	35,9	35,7	36,0	36,5	37,1	Manufacturing
E.	Παροχή ηλεκτρικού ρεύματος, φυσικού αερίου και νερού	1,5	1,5	1,5	1,6	1,7	1,7	1,7	1,8	Electricity, gas and water supply
F.	Κατασκευές	27,5	29,0	31,0	32,6	34,0	35,5	37,5	38,6	Construction
G.	Χονδρικό και λιανικό εμπόριο, Επισκευή αυτοκινήτων, μοτοσικλετών και ειδών προσωπικής ή οικιακής χρήσης	56,7	57,5	58,2	60,7	62,5	64,5	67,1	69,8	Wholesale and Retail trade; Repair of motor vehicles, motorcycles and personal and household goods
H.	Ξενοδοχεία και εστιατόρια	34,0	33,9	34,0	34,4	35,0	36,0	36,8	37,0	Hotels and restaurants
I.	Μεταφορές, αποθήκευση & επικοινωνίες	22,2	22,5	22,5	23,3	24,0	24,3	24,6	24,5	Transport, storage and communication
J.	Ενδιάμεσοι χρηματοπιστωτικοί οργανισμοί	16,0	15,6	15,4	15,5	15,6	16,0	16,7	17,1	Financial intermediation
K.	Διαχείριση ακίνητης περιουσίας, εκμίσθωση & επιχειρηματικές δραστηριότητες	16,5	17,5	18,3	19,5	20,6	22,0	23,7	24,4	Real estate, renting and business activities
L.	Δημόσια διοίκηση και άμυνα. Υποχρεωτική κοινωνική ασφάλιση	22,4	23,2	24,1	24,6	25,8	26,4	26,7	27,8	Public administration and defence; Compulsory social security
M.	Εκπαίδευση	17,0	17,7	18,0	18,3	18,6	19,1	19,6	20,3	Education
N.	Υγεία και κοινωνική μέριμνα	12,3	12,7	12,9	13,3	13,7	14,2	14,6	15,2	Health and social work
O.	Άλλες δραστηριότητες παροχής υπηρεσιών υπέρ του κοινωνικού συνόλου ή κοινωνικού και ατομικού χαρακτήρα	14,5	14,9	15,0	15,3	15,6	16,1	16,8	17,3	Other community, social and personal service activities
P.	Ιδιωτικά νοικοκυριά που απασχολούν οικιακό προσωπικό	9,3	10,6	12,3	14,3	15,8	16,7	17,5	20,0	Private households with employed persons
	Επικερδώς απασχολούμενος πληθυσμός για την παραγωγή του ΑΕΠ	**318,1**	**323,8**	**331,5**	**342,1**	**349,5**	**358,0**	**368,0**	**378,1**	**Gainfully employed population for the production of G.D.P.**
Q	Ετερόδικοι οργανισμοί	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	Extra territor. organ. and bodies
	Άνεργοι	12,8	10,8	14,1	16,7	19,5	17,0	15,4	14,5	Unemployed
	Άλλος οικον. ενεργός πληθυσμός	9,7	10,0	9,3	9,0	8,8	8,1	8,5	8,4	Other econ. active population
ΣΥΝΟΛΟ ΟΙΚΟΝΟΜΙΚΑ ΕΝΕΡΓΟΥ ΠΛΗΘΥΣΜΟΥ		**343,4**	**347,4**	**357,7**	**370,6**	**380,6**	**385,9**	**394,7**	**403,8**	**TOTAL ECONOMICALLY ACTIVE POPULATION**

The above table presents that the majority of labour force is on the public sector, about 70,000 workers. A great number is also involved in tourism and services, about 95,000 workers. The service sector – in particular tourism, off-shore commercial and financial services and maritime navigation companies – is considered to be the backbone of the Cypriot economy. Tourism and financial services dominate the Cypriot economy, accounting for more than 40% of gross value-added. Specifically, tourism contributes more than 30% of gross value added including the secondary benefits of the sector on retailing and construction. It is clear that Cyprus has to invest to these sectors i.e.

services, banking, telecommunications and tourism through a proper skills development system.

Tourism is the 'engine' of Cypriot economy. However, tourism has developed a reputation as a low paid, low skilled sector, typified by high turnover of staff, persistent lack of qualified personnel and changing skills needs. The development of tourism is highly dependent on the ability of those working in the sector to attract both new and repeat tourism and thus adequate and appropriate investment in staff is necessary if tourism is to remain a high-growth sector.

According to Malaos (2001), employment is in the low skilled spectrum and imbalances in the labour market are solved mainly through the use of foreign labour on a temporary basis. The sectors with acute qualitative imbalances are hotels and restaurants, manufacturing and retail trade, which employ a high percentage of foreigners and have high rates of unemployment. This indicates that the labour supply cannot be met from unemployed 'local tank'. Factors that account for the imbalances in the labour force include the small size of the workforce, the paradigm shift towards services, and technological changes.

The best medicine in this situation can be either the skills forecasting procedure or the Cyprus economy orientation. The technological upgrade and exploitation of the economy's comparative advantages will create the conditions in order Cyprus becomes an international high quality business and service centre. The attractiveness of Cyprus is based on macroeconomic stability, the low corporation tax, the liberal foreign investment policy, the low company set up and operating costs as well the high quality level of professional services.

In the next tables I will provide some data taken from Cyprus Statistical Office (2009) regarding sex, age and education level. These data will be the guidelines for the next steps regarding skills development policies.

TABLE 7: Employment by sex and educational level (*Source: Cyprus Statistical office 2009*)

(Χιλιάδες - Thousands)

Μορφωτικό Επίπεδο	2004			2005			2006			2007			2008			Educational Level
	Σύνολο Total	Άντρες Males	Γυναίκες Females	**Σύνολο Total**	Άντρες Males	Γυναίκες Females	**Σύνολο Total**	Άντρες Males	Γυναίκες Females	**Σύνολο Total**	Άντρες Males	Γυναίκες Females	**Σύνολο Total**	Άντρες Males	Γυναίκες Females	
Χωρίς Μόρφωση	**8,8**	4,9	3,9	**6,9**	4,0	2,9	**5,0**	2,5	2,5	**5,1**	2,8	2,3	**5,1**	3,2	1,9	No schooling
Στοιχειώδης (Δημοτικό)	**54,2**	34,1	20,1	**55,1**	35,0	20,1	**51,7**	32,7	19,1	**47,9**	30,3	17,5	**45,3**	29,2	16,1	Primary
Γυμνάσιο (3 πρώτες τάξεις)	**35,3**	19,5	15,8	**35,7**	20,2	15,5	**35,3**	20,1	15,2	**35,5**	20,8	14,7	**35,4**	19,3	16,1	Lower Secondary
Λύκειο/Τεχνική/ Επαγγελματική Εκπαίδευση Μεταλυκειακή όχι τριτοβάθμια	**130,9**	76,3	54,6	**141,2**	82,9	58,3	**145,8**	86,3	59,5	**154,7**	90,2	64,5	**154,8**	92,2	62,6	Upper Secondary/Technical/ Vocational Education/ Post-secondary not tertiary
Κολλέγιο	**40,6**	18,0	22,6	**41,2**	18,9	22,2	**46,1**	20,7	25,4	**48,8**	21,1	27,7	**51,7**	21,8	29,9	College
Πανεπιστήμιο	**68,3**	37,9	30,4	**68,0**	36,4	31,6	**73,4**	38,1	35,3	**86,0**	44,2	41,8	**90,6**	46,6	43,9	University
ΣΥΝΟΛΟ	**338,0**	**190,8**	**147,2**	**348,0**	**197,3**	**150,7**	**357,3**	**200,4**	**156,9**	**377,9**	**209,5**	**168,5**	**382,9**	**212,2**	**170,6**	**TOTAL**

The above table shows that there is an increase in the labour force year by year both in men and women. Another important point is that about 37% of the total working force have tertiary education i.e. 142,300 workers. This is a set of high skills that we need to build on.

TABLE 8: Economic activity by sex and age group (*Cyprus Statistical Office 2009*)

(Χιλιάδες - Thousands)

Ηλικία Age Group	2003			2004			2005			2006			2007			2008		
	Σύνολο Total	Άντρες Males	Γυναίκες Females	Σύνολο Total	Άντρες Males	Γυναίκες Females	Σύνολο Total	Άντρες Males	Γυναίκες Females	Σύνολο Total	Άντρες Males	Γυναίκες Females	Σύνολο Total	Άντρες Males	Γυναίκες Females	Σύνολο Total	Άντρες Males	Γυναίκες Females
15-19	**4,4**	2,2	2,3	**4,9**	2,5	2,4	**4,3**	2,5	1,8	**3,9**	2,3	1,5	**4,2**	2,1	2,0	**4,9**	2,7	2,2
20-24	**31,0**	15,0	16,0	**32,5**	16,7	15,8	**35,4**	18,0	17,4	**35,2**	17,9	17,3	**34,9**	17,0	17,9	**34,1**	16,1	18,1
25-29	**45,0**	23,3	21,7	**47,0**	24,7	22,3	**49,6**	26,5	23,1	**50,2**	26,3	23,9	**56,6**	29,5	27,1	**56,6**	28,5	28,1
30-34	**44,9**	22,6	22,3	**47,2**	24,9	22,3	**49,2**	26,3	22,9	**50,7**	27,0	23,7	**52,9**	28,0	24,9	**54,2**	28,8	25,4
35-39	**45,9**	23,6	22,4	**47,2**	24,7	22,6	**47,2**	25,3	21,9	**48,7**	25,7	23,0	**48,3**	25,1	23,1	**48,3**	26,1	22,2
40-44	**47,1**	25,9	21,2	**48,4**	26,2	22,2	**49,6**	26,4	23,1	**50,2**	26,8	23,4	**50,2**	27,0	23,2	**49,5**	26,6	22,9
45-49	**40,3**	22,7	17,6	**42,2**	23,4	18,8	**44,9**	24,8	20,1	**46,3**	25,5	20,7	**48,4**	27,1	21,4	**48,9**	27,5	21,4
50-54	**35,7**	20,8	14,9	**37,4**	21,2	16,1	**37,4**	21,7	15,7	**37,4**	22,1	15,3	**40,1**	23,1	17,0	**40,9**	23,3	17,6
55-59	**23,3**	15,5	7,8	**24,8**	16,6	8,2	**26,4**	17,2	9,2	**27,6**	17,2	10,4	**31,0**	18,5	12,4	**32,0**	19,5	12,5
60-64	**13,4**	9,3	4,1	**13,7**	9,9	3,8	**13,6**	9,9	3,7	**15,2**	10,6	4,6	**16,8**	11,5	5,3	**16,2**	10,8	5,4
65+	**10,1**	8,0	2,1	**9,4**	7,0	2,4	**10,1**	7,8	2,3	**9,0**	6,9	2,1	**10,1**	7,8	2,2	**11,7**	9,4	2,3
ΣΥΝΟΛΟ-TOTAL	**341,2**	**188,7**	**152,5**	**354,7**	**197,8**	**156,9**	**367,5**	**206,4**	**161,1**	**374,3**	**208,4**	**165,9**	**393,4**	**216,8**	**176,6**	**397,4**	**219,2**	**178,2**

The majority of the labour force in Cyprus is between the age groups 25 to 39 i.e. 40% of the total number. However, there are also concerns about unemployment which is clear from the next table.

TABLE 9: Unemployment by sex and educational level (*Cyprus Statistical Office 2009*)

ΗΛΙΚΙΑ	1ο Τρίμηνο 1st Quarter			2ο Τρίμηνο 2nd Quarter			3ο Τρίμηνο 3th Quarter			4ο Τρίμηνο 4th Quarter			Μέσος Όρος Έτους Year Average			AGE GROUP
	Σύνολο Total	Άνδρες Males	Γυναίκες Females	Σύνολο Total	Άνδρες Males	Γυναίκες Females	Σύνολο Total	Άνδρες Males	Γυναίκες Females	Σύνολο Total	Άνδρες Males	Γυναίκες Females	Σύνολο Total	Άνδρες Males	Γυναίκες Females	
Χωρίς μόρφωση	326	72	254	121	0	121	197	0	197	167	167	0	203	60	143	No schooling
Δημοτικό	2.759	1.492	1.267	1.749	845	904	1.727	1.026	701	1.517	874	642	1.938	1.059	878	Primary
Γυμνάσιο	2.570	1.247	1.323	1.452	612	841	1.603	1.046	557	5.148	806	1.611	2.011	928	1.083	Lower Secondary
Σύστημα Μαθητείας	433	433	0	244	244	0	296	296	2	244	244	0	304	304	0	Apprenticeship Programme
Λύκειο ή Τεχνική ή Επαγγελματική	6.913	3.581	3.332	4.851	1.940	2.911	4.809	2.528	2.281	5.298	3.237	2.060	5.468	2.822	2.646	Upper Secondary or Techninical or Vocational
Μεταλυκειακή όχι τριτοβάθμια	312	91	221	136	0	136	274	0	274	293	0	293	254	23	231	Post-Secondary not tertiary
Τριτοβάθμια 2-3 χρόνια	1.708	972	736	1.267	705	562	1.320	488	832	934	223	711	1.307	597	710	Tertiary 2-3 years
Πανεπιστήμιο/ Κολλέγιο 3-4 χρόνια	3.126	1.235	1.891	2.627	1.233	1.394	3.814	1.158	2.656	2.183	661	1.522	2.937	1.072	1.866	University/ College 3-4 years
Διδακτορικό	0	0	0	0	0	0	106	106	0	297	297	0	101	101	0	Doctorare
ΣΥΝΟΛΟ	**18.146**	**9.123**	**9.024**	**12.448**	**5.580**	**6.868**	**14.146**	**6.649**	**7.497**	**13.351**	**6.511**	**6.840**	**14.523**	**6.999**	**7.557**	**TOTAL**

The total unemployment for 2008 is 14523 workers i.e. 3.6% of the total active population. The unemployment in tertiary education is 4345 i.e. 30% of the total unemployment.

Additional characteristics of the labour market in Cyprus are presented in the following paragraphs. It has to be considered that the labour market in Cyprus operates in an environment with well established social dialogue. The unions are trying to balance their claims and the will of in discussion with the government and the employer's federation. That is the reason that the structure of Cyprus labor system is not suffering with fluctuations of strikes or other movements. The present system of industrial relations in Cyprus has been developed on the basis of two fundamental principles, voluntarism and cooperation. Collective bargaining has traditionally played a leading role in regulating

industrial relations. The main national trade unions are the Pancyprian Federation of Labour (PEO), the Cyprus Employees Confederation (SEK), the Democratic Labour Federation of Cyprus (DEOK), Pancyprian Public Employees Trade Union (PASYDY). The table below presents work stoppages and workdays lost by sector of economic activity between the years 1999 – 2003.

TABLE 10: Work stoppages and workdays lost by sector of economic activity, 1999 – 2003

Sector (ISIC 1968)	Total	1 Agricult. etc	2 Mining Quarrying	3 Manufact.	4 Electricity etc	5 Construction	6 Trade, Hotels etc	7 Transport., Commun-ication.	8 Finance etc	9 Community Social and Personal Services
Work Stoppages:										
1999	21	0	0	2	0	2	4	7	0	6
2000	6	1	0	0	0	1	2	1	0	1
2001	25	3	0	1	0	7	3	0	5	6
2002	23	2	0	2	3	2	3	7	2	2
2003	18	0	0	0	0	5	2	1	0	10
Workers Involved:										
1999	2108	0	0	64	0	150	283	1265	0	346
2000	180	40	0	0	0	20	78	28	0	14
2001	1699	222	0	28	0	404	68	0	406	571
2002	3496	60	0	89	2034	330	152	679	58	94
2003	3535	0	0	0	0	115	2847	50	0	523
Workdays Lost:										
1999	26037	0	0	64	0	300	19513	5695	0	465
2000	1136	600	0	0	0	360	78	28	0	70
2001	4778	1821	0	140	0	891	57	0	1237	632
2002	7051	80	0	317	2289	2130	304	1262	575	94
2003	6901	0	0	0	0	620	5659	50	0	572

Source: Department of Labour Relations (2004)

It is obvious from the above data that there is 'peace' in labour relations. According to provisional data from the Department of Labour Relations, a further dramatic decline in the number of industrial actions occurred in 2008. More specifically, in 2008, the number of strikes fell to three from eight in 2007, according to the revised data for 2007. However, no data were available on the number of workers involved, the working days lost or the distribution of strikes by sector of economic activity.

An important parameter of the labour force in Cyprus is the big number of the foreign workers. Reich (1983) states that:

> Skilled labour has become a key barrier against low wage competitions for the simple reason that it is the only dimension of production in which existing capitalist powers retain an advantage. Technological innovation may be bought or imitated by anyone. High-volume standardised production facilities may be established anywhere. But production processes that depend on skilled labour must stay where it is (p.127).

I will now present the situation regarding foreign workers in Cyprus

6.1. FOREIGN WORKERS IN CYPRUS

As it is mentioned at the beginning of this chapter, foreign workers play an important role in Cyprus economical activity. The EU enlargement in May 2004 create two 'poles' regarding workforce, the 'rich' West Europe and the 'poor' East Europe. The commitment to the free movement of labour within the Union raises the possibility of a substantial East-West wave of migration.

The European Commission adopted an action plan for skills and mobility in February 2002. Through the European Commission report a number of measures facilitating labor market mobility are presented. The most important measures concentrated on making educational and training systems more responsive to the needs of the labor market, raising educational levels and reducing the numbers of people who leave school without formal qualifications and making qualifications more transparent and transferable i.e. the creation of the Europass portfolio of documents.

According to Levine et al. (2003) the economic impact of East-West migration in an enlarged European Union is that:

> East-West migration induces two effects: an efficiency effect from the more efficient use of labor in the West and a sectoral reallocation effect arising from the change in the

> skilled-unskilled wage rates. The first effect is studied by examining migration with no skill bias and the second by examining migration of exclusively skilled labor (p. 26).

They also argue that:

> Both types of migration result in an increase in world growth in the steady state. Skilled-labor migration results in a shift out of the high-tech sector in the East so that eventually at a level of migration over to 5% of the Western population that sector disappears altogether. Then Eastern specialization in traditional sectors occurs (Levine et al. 2003, p. 27).

The above views are not a 'dogma'. However the majority of mobile workers from the East, even with high skills, are involved with activities below their knowledge status. In order to understand the whole situation we have to investigate what economic factors drive international migration of workers and how they vary across different skill levels. There are two basic questions: The first is whether the overall international migration varies in intensity across skill categories? The second is to check whether free mobility changes workers' incentives to move?

The answers to these questions are given by the immigration flow model from Gross and Schmitt (2003) that links labour-market opportunities for new immigrant workers to cultural networks. The probability that an individual will move from a country to another depends on the comparison of earnings in both location and on migration costs. For an individual i with skill level s_i who contemplates migrating to a destination country d, the gross gain from migrating is $w_d(s_i)-w_o(s_i)$, where w_o (w_d) is the wage in the country of origin (destination). Naturally, wage increases with skills ($w'(s_i)>0$). If the costs of migrating are denoted by C, the probability of migrating can be written as:

$$q=q[wd(si)-wo(si)C]$$

Gross and Schmitt (2003) found that standard migration points (i.e. language, religion, distance) influence the movement of low-skill workers. On the other hand only financial factors matter for high-skill workers. They also found that a migration policy is effective at controlling flows of low-skill migrants whereas free mobility or marginal relaxation of

migration constraints have little impact on high-skill flows. However, Thorns (2002) argues that in the twenty-first century, the patterns of migration could change from unskilled labour to professional and technical workers.

Referring to Pricewaterhouse - Coopers (an international accounting group) report (2004), it is obtained a number of several types of mobile workers (p. 3). The most characteristic types are the following:

- the 'traditional' international expatriate whereby an employer moves an employee to live and work in a foreign country, either long-term, typically between two and five years, or short-term, usually between one and twelve months, but always on the basis that the employee is expected to return 'home'
- the local hire in which a foreign-born individual is recruited and works locally in their place of work which is not their birthplace or place of permanent residence
- the cross-border commuter, which is a more recent form of mobility, whereby an employee commutes from their home to a place of work in another country, usually on a weekly or bi-weekly basis, while their place of residence remains unchanged in their home country
- a virtual assignee who assumes business responsibilities which span several countries and works as part of a team located in several countries but does not need to relocate: a virtual assignment often involves extensive business travel to work with colleagues (rather than to develop new client or supplier relationships) and is supported by wide use of information and communications technologies (ICT); and
- tele-working whereby an employee, supported by information and communications technologies, works from any location, especially his or her home

Cyprus is one of the countries which it is affected by migration due to its geographical position and the type of its workforce orientation. From the early 1990s, after the fall of USSR and the Eastern Block, many people from those countries with Greek origins, chose Cyprus as their 'next stop'.

Trimikliniotis and Demetriou (2005) found that:

> Immigration policy in Cyprus was largely formulated in the 1990s, when the government decided to abandon the restrictive policies followed until then and allow more migrant workers into the country in order to meet labor shortages. This change of policy meant that Cyprus was almost overnight transformed, from a country that traditionally exported migrants to all corners of the earth, to a net recipient of migrants from all over the globe … Most of these are migrant workers whose main areas of employment are: domestic workers, service industry (tourism, trade), manufacturing industry, agriculture and construction (2005, p.4).

An important date regarding labor immigration is April 2003, when for the first time after almost thirty years, the restrictions in movement between the north and the south of the island, (Cyprus was divided after Turkish troops invasion in 1974) were partially lifted. After that, several thousand Turkish-Cypriots crossed the dividing line every day to work in the southern part, where manual jobs are more readily available and the pay is better. This fact creates a form of *internal* mobile labour.

The table below shows in detail the picture of immigrants' population in Cyprus the last few years.

TABLE 11: Foreign Workers by activity (*Source: statistical office 2009***)**

Οικονομική Δραστηριότητα NACE Αναθ. 1.1		Αριθμός Εργαζομένων Employed Persons						Economic Activity NACE Rev. 1.1
		2003	2004	2005	2006	2007	2008	
A.	Γεωργία, θήρα και δασοκομία	3.474	3.803	3.952	3.770	3.846	4.125	A. Agriculture, hunting and forestry
B.	Αλιεία	40	44	50	42	61	76	B. Fishing
C.	Ορυχεία και λατομεία	46	55	80	78	97	113	C. Mining and quarrying
D.	Μεταποιητικές βιομηχανίες	3.413	3.963	4.696	5.144	6.687	8.485	D. Manufacturing
E.	Παροχή ηλεκτρικού ρεύματος, φυσικού αερίου και νερού	11	11	21	33	39	46	E. Electricity, gas and water supply
F.	Κατασκευές	3.458	4.612	5.613	7.289	10.166	13.091	F. Construction
G.	Χονδρικό και λιανικό εμπόριο, Επισκευή αυτοκινήτων οχημάτων, μοτοσικλετών και ειδών προσωπικής ή οικιακής χρήσης	4.401	4.886	6.071	6.850	9.362	12.448	G. Wholesale and Retail trade; Repair of motor vehicles, motorcycles and personal and household goods
H.	Ξενοδοχεία και εστιατόρια	7.720	9.253	11.502	12.786	15.210	16.592	H. Hotels and restaurants
I.	Μεταφορές, αποθήκευση & επικοινωνίες	1.388	1.535	1.631	1.970	2.488	3.097	I. Transport, storage and communication
J.	Ενδιάμεσοι χρηματοπιστωτικοί οργανισμοί	507	534	545	572	808	987	J. Financial intermediation
K.	Διαχείριση ακίνητης περιουσίας, εκμίσθωση & επιχειρηματικές δραστηριότητες	1.691	1.824	2.533	3.575	5.402	7.843	K. Real estate, renting and business activities
L.	Δημόσια διοίκηση και άμυνα. Υποχρεωτική κοινωνική ασφάλιση	51	33	72	1.980	2.210	2.438	L. Public administration and defence; Compulsory social security
M.	Εκπαίδευση	524	614	810	987	1.099	1.271	M. Education
N.	Υγεία και κοινωνική μέριμνα	685	782	978	1.199	1.479	1.662	N. Health and social work
O.	Άλλες δραστηριότητες παροχής υπηρεσιών υπέρ του κοινωνικού συνόλου ή κοινωνικού και ατομικού χαρακτήρα	1.008	1.070	1.526	2.120	2.697	3.342	O. Other community, social and personal service activities
P.	Ιδιωτικά νοικοκυριά που απασχολούν οικιακό προσωπικό	12.236	14.291	15.749	16.730	17.554	19.990	P. Private households with employed persons
	Μή δηλωθείσες δραστηριότητες	3	-	-	849	735	754	Not stated activities
	ΣΥΝΟΛΟ	**40.656**	**47.310**	**55.827**	**65.973**	**79.938**	**96.324**	**TOTAL**

Year by year there has been a constant increase to the number of foreign workers. In 2008 they comprised 25% of the total labour force. The majority of them are employed in private households, the tourism sector and the construction industry. The majority of foreign workers even with high skills are involved with activities below their knowledge status. This fact and the presence of big numbers of immigrants pose diverse problems which can be categorized as follows:

- There are questions concerning the identity of the immigrants, the causes of their immigration, their expectations, their practices in the new environment of settlement (relations between them, attitudes towards the indigenous people, their organizations and the vindication of their rights).

- There are questions regarding the response of the indigenous people to these 'foreigners', to their behaviour on an everyday basis and/or in the working environment. These include questions about the policies of the government and the authorities about the immigrants.
- May pose some questions concerning the impact of the immigrants' presence in different fields: economic (on economic growth rates, unemployment, wages, etc.), political (repercussions with regard to elective behaviour and political practice), social (with regard to potential criminality, together with needs for social care and education), and legal (with regard to the existing legal framework covering individual and civil rights).

6.2. SUMMARISING THE CYPRIOT ECONOMIC PERFORMANCE

Based on the above I will summarize the Cyprus economic situation.

The performance of the economy of Cyprus since independence in 1960, except for a short period that followed the partition of the country following the 1974 invasion, has been quite satisfactory. This decline of 1974 however, was followed by an "economic miracle" during 1975-1978, when the average real growth rate was 13.8 per cent and investments increased from 22.5 per cent of GDP in 1975 to 30.7 per cent in 1978. The average real growth rate during the 1980s was 6.2 per cent and in the 1990s 4.4 per cent. In and after 2002, the Cyprus economy, meanwhile highly dependent on tourism, suffered a substantial deceleration of its economic growth due to the aftermath of the 11 September events in the United States, and the international increase in oil prices. Other reasons could be the changes in work organization, the degree of monopoly in the economy as well the literacy and skills of the workforce. Another hidden fact is the long hours of work of low skilled workers. Some other points to be considered are that the Cyprus economy decelerated sharply throughout 2009 as it is affected by the internationally adverse economic environment. Also Cyprus recorded a negative growth rate overall for 2009 of 1.7% for the first time in 30 years.

In order to put again Cyprus in a growth orbit it is necessary to increase productivity and competitiveness. The low competitiveness of the economy is a problem. The reasons could be the labour market flexibility (i.e. long hours of low skilled workers) as well the low participation in lifelong learning programmes and the inadequate connection between education and training, and the labour market. Those parameters will be examined in the development of this thesis.

At this point, is good to summarize the data we have in front of us. In Cyprus there are significant numbers of immigrants covering low skill jobs.

> The migration model in Cyprus is characterised by the limited duration of the migrants stay in Cyprus, the fact that work and entry permits are linked to one particular employer, the extreme exploitation in terms of salary and working hours, the flagrant violations of contractual provisions on the part of the employers. (Trimikliniotis and Demetriou 2005, p. 48).

Migrant workers generally enjoy low status and low pay, but these are better than the situation in their countries. The majority of them are granted work permit to do a specific job, for a specific employer and for a specified time.

Another important fact is the over-supply of educated labour with high standard qualifications even though there are skill shortages because of the mismatching between high skill supply and demand. However, if we consider the early development of economies like Korea and Ireland, both were able to take off economically because they had a large underutilized supply of graduates. This is a note of hope. Although the question remains as to whether they have higher education degrees in the areas needed for the economy.

The success of Singapore, in particular, but also China and India and their movement into the production of high value-added, high-tech product markets, provides inspiration but it also points to an important lesson, especially from Singapore: that the economic strategy does not lie through the quality of products alone but through innovation and productivity

growth. The policy makers suggest that education and training as well life-long learning are good ‘medicines’ for success but not the best one.

The question is how can a small country like Cyprus maintain a high-wage, high-skill economy as it can't compete with the high skill low wages economies of South East Asia. Brown et al. in their recent work *The Global Auction* (2011) are giving a signal arguing that countries with good basic education, good language skills and who are hooked into the global economy may gain some advantage until their costs rise. But there must be something unique to the competitive advantage of Cyprus in the goods and services they provide.

In the next chapter I will see where Cyprus is, on this journey of economic development.

CHAPTER SEVEN

HOW FAR HAS CYPRUS COME IN THE ROAD TOWARDS A HIGH SKILLS KNOWLEDGE ECONOMY?

In this chapter I shall outline some of the key issues with respect to Cyprus that have been raised through the literature review with respect to education, innovation and co-ordination, bearing in mind the criteria developed in the framework by Ashton and Green (1996). It is clear that there are issues concerning the Cypriot education system and that the supply side in Cyprus cannot be taken for granted. At the same time we have seen from the triple helix analysis that education needs to be linked with innovation which in turn needs to be disseminated into industry which requires co-ordination.

7.1 EDUCATION

When we look at the situation of education and education reform in Cyprus we need to bear in mind the first two criteria outlined by Ashton and Green (1996). These were that the government should be committed to achieving high skill formation and that the education system must be effective. However, recent debates about education in Cyprus reflect the struggle with past traditions and with a concern with neo-liberal education policies.

The Recent Political and Policy Background

Cyprus entered the twenty-first century as a divided nation state. Nearly three decades of ethnic conflict are symbolized in its divided capitol city, Nicosia. The United Nations peacekeeping forces stationed in Cyprus are a daily reminder to a generation that has suffered the pain of the Cyprus conflict. The effect of this ethnic conflict on students and

the educational process is hard to understand or measure. The necessity for further research into the psychological effects of ethnic and political conflicts on children in general, and in Cyprus in particular, has been emphasized (Charalambous 2001).

The last decade was very important regarding the political spectrum in Cyprus. It is characterized by the entrance of Cyprus in European Union as well the trials for political settlement of Cyprus problem. The most important year was the 2004, the year of integration with Europe and the year of Annan Plan. The **Annan Plan** was a United Nations proposal to settle the Cyprus dispute. Referendums were held in parallel on both sides of the island on 24 of April 2004 and resulted in Turkish Cypriots voting a 64.90% YES for the UN plan and Greek Cypriots voting a 75.83% NO against the UN plan. The main reasons for the 76% "No" vote among Greek Cypriots in the referendum were their perception that the Annan Plan was unbalanced and excessively pro-Turkish, and that it had inadequate safeguards for Greek Cypriots in the north. Many analysts have the view that Annan plan was the catalyst in any changes in Cyprus.

At this point, I will present the four biggest political parties and their views regarding European integration.

AKEL (*Progressive Party of the Working People*)

AKEL definitely provides the best case study regarding the effect of Europeanization on political actors since it's the only party that changed position towards the EU. The change in position cannot be entirely attributed to the EU challenge but it was one of the two major ones; the other being the collapse of the Soviet block. AKEL found itself in a very difficult position in the early 1990´s facing both the impact of the collapse on its ideology legitimacy and an internal crisis resulting from that. The new world that emerged created the need for redefining the party's strategy towards a favourable stance. The absence of any realistic alternatives and the overall acceptance of EU by the public of Cyprus

combined with the realization that it could act as a cohesive lever to reunite Cyprus, made AKEL to alter its position. AKEL is constitutes 33% of the electoral base.

DISY (*Democratic Rally*)

DISY´s (conservative right wing party) position towards the EU was strongly in favour ever since the party came to existence in 1976. EU membership represented an ideological and political target for the party; that is because its objectives for reforming the society in a liberal way and of belonging to the West were served by this option. DISY constitutes 34% of the electoral base.

DIKO *(Democratic Party)*

Like DISY, DIKO (a centre-right party) was strongly in favour of EU membership both for ideological and political reasons too. The fact that governments from this party were in office from 1977 to 1988 gave the party the opportunity to present itself as the "driver" and the one that should take the credit for the successful ending of this course. The fact that Cyprus has achieved after the backward slash caused by the Turkish invasion of 1974, to catch up with the rest of the developing countries and meet all the economic criteria of the Union was attributed to a large extent to DIKO which constitutes 15% of the electoral base.

EDEK *(Movement of Social Democrats)*

The party was established in 1969 .The party is still under the influence of its charismatic founder, Vassos Lyssaridis who guides the party's policy ever since its foundation. EDEK is very strongly influenced by the Greek Socialist party PASOK and almost follows its strategic choices. One of them was the EU membership as a security mechanism against any Turkish advancement. EDEK has been stacked with a very narrow and small percentage that never went beyond 10%. Nevertheless the party is one of the strongest supporters of EU membership. EDEK constitutes 9% of the electoral base

When Cyprus entered E.U. on 1st of May 2004, there was a coalition between DIKO (Democratic Party), AKEL (communistic party which is the 'big' player) and EDEK (socialistic party). The President of Cyprus was Tassos Papadopoulos, a veteran politician, who tried to balance neo-liberal forms and leftist approaches. In the general elections of the February 2008, the same coalition has stayed in power but the president is Dimitris Christofias, a traditional communist and general secretary of AKEL. The Progressive Party of Working People, AKEL, was founded in 1926 with the name Communist Party of Cyprus (CPC). The communist party set as its aim not only the struggle against exploitation but also the liberation of Cyprus from the British. In the years following the 1960 declaration of independence AKEL struggled to defend the independence and territorial integrity of the Republic of Cyprus from foreign interventions that culminated in July 1974 with the fascist coup of the Greek Junta and the terrorist organization EOKA B' and the Turkish invasion that followed. Akel's ideology is Marxist-Leninist but the party is pragmatic and many believe that Akel is very close to the ideas of old Labour in Britain. It is a member of the European United Left - Nordic Green Left in the European Parliament and it is considered as moderately eurosceptic.

After three years in power, the Christofias government is following the same policies as the previous government, with no visible signs of Marxist theory in action. AKEL has strong relations with the labour unions and that is a point to be considered regarding social, economical and educational development. Before their victory in national elections at 2008, they had quite different views regarding the philosophy of the labour market and the role of Europe (especially Lisbon Strategy).

A characteristic example of this situation is a seminar of communist and workers' parties and personalities in the education field with the subject: *The Lisbon strategy and restructuring of education systems - Fronts of struggle and the response of the workers and communist movement* which took place in Athens on 8-9 of April 2006. The main findings were that through the selection mechanisms and the class barriers there was an exclusion of the majority of students from a systematic, broad education. Also the

narrowing of general education and the flagrant commercialization and downgrading of knowledge through the substitution of mass education by individual forms of lifelong learning, utilitarian skills and subservient competencies, put the younger generation at a disadvantage, wandering between training and unemployment.

Dimitris Christofias's speech at the meeting against neo-liberal policies, Nicosia 3rd March 2007 (before being elected as a president of Cyprus) argued that in Europe fundamental rights of working people are under attack in the name of competitiveness of the economy. The historically formed European social model, which the people of Europe have gained through sacrifices, had been sidelined and the Lisbon Strategy had taken its place with macro-economic stability, liberalisation of the services sector and flexible forms of employment being central. He was arguing against what he saw as the neo-liberal consensus around the Lisbon Strategy.

So given a concern with a neo-liberal vocationalisation of education and previous emphasis on seeing education as part of nation building within the framework of a traditional Greek concept of education, how has educational reform in Cyprus been approached?

7.2 EDUCATIONAL REFORM in CYPRUS

Pressman and Wildavsky (1973) argued that the chances of success of any government reform initiative are indeed slim and have a significant failure bias. According to Grindle (2004) change most often alters boundaries of responsibility, winners and losers and ignites conflict, dissent and resistance. That is why inertia can be built into policy making because it causes too much conflict and can considered high risk.

However, in contrast Souto Otero (2011) has the view that:

> Governments are important stakeholders in educational policy development, who can push forward legislative reforms and substantially steer, if indeed not fully control,

> implementation and strategically operate to win other stakeholders during the reform process (p.87).

Let's see what happened with the trials of Cyprus governments for educational reform the last twenty years (irrespective political ideologies).

Carnoy (1999) argued that:

> Changes in the world economy have provoked three kinds of responses in the education and training sectors. Reforms that respond to shifting demand for skills in both the domestic and world labour markets and to new ideas about organizing the production of educational achievement and work skills can be called 'competitiveness-driven reforms'. Reforms that respond to cuts in public-sector budgets and private company incomes, reducing public and private resources available for financing education and training can be called 'finance driven reforms'. Reforms that attempt to improve education's important political role as a source of social equalization can be called 'equity-driven reforms' (p. 37).

It is obvious that with the present standards the *competitiveness-driven reform was* one way. Another driver instrument for educational reform was the European dimension of Cyprus. So from the decade of 1990 some trials for change were employed. The UNESCO Report (1997) on the assessment of the Cyprus educational system provided a range of suggestions that were considered of immense value for the development of the system. The basic guideline was the unification of secondary education. The main objectives of that unification were:

- To allow students to choose a specific course of studies at a more mature age (16+, according to UNESCO).
- To create a unified system of secondary education, whereby technical and vocational courses will be organised side by side with other courses and not in separate schools, as is the case today, thus also fighting the bias against technical education.

In an effort to eliminate widespread prejudice towards technical/vocational education and to affect qualitative change in the sphere of secondary education to meet the growing demands for mobility and flexibility within the boundaries of a United Europe, proposals of an *ad hoc* committee resulted in the new concept of the *Eniaio Lykeio* (Unified Lyceum).

Eniaio Lykeio had been implemented at a pilot basis (1995) in three selected urban schools. The Eniaio Lykeio was a project with major task to integrate the general education programme and the technical/vocational branch. The integration of secondary education was intended to render lyceum education consistent with modern trends, especially those prevalent in the European Community and to broaden curricula in order to enhance the relevance of education to the real world.

The Eniaio Lykeio aimed at:

- offering pupils the opportunity to develop all aspects of their capabilities through modern general and specific scientific and technological knowledge, methods and media, so that they can respond to a changing world and adapt to an evolving work environment.
- linking the school with the outside world. Thus offering the pupils opportunities to familiarise themselves with the world of work and production in order to plan their career more effectively, whether they aim at being employed, venturing into entrepreneurship or pursuing higher education.
- expanding curricula and offering programmes with diversity and flexibility, incorporating the selection of individual subjects as opposed to combinations of subjects, and deferring specialisation.

After the operation of the ‘Eniaio Lyceio’ for three years in the area of the capital Nicosia, the whole policy had been evaluated in 1998. A committee undertook that task having as president M. Kassotakis, professor at the University of Athens and members A. Demetriou, professor at the University of Cyprus, L. Antoniades, Pedagological Institute, K. Pillas, Pedagological Institute, C. Michael, Planning Bureau and L. Paschalides, an industry representative. The main findings of that committee were the following:

- The program of study was flexible giving to the students the opportunity to choose the content of the subjects in which they have personal interest.
- The compulsory technological subjects offered to the students a ‘taste’ of the high demanding environment in which would be citizens.
- There was more interest in technical university studies and jobs.

All the above were the positive findings. However, there were also negative effects and problems i.e.:

- The buildings, the laboratories, the teaching material, were not adequate in order to achieve fully the aims of the ‘eniaio lykeio’.
- There was no homogeneity regarding the students who select certain subjects i.e. mathematics.
- The information which was given to teachers, students and parents was inadequate to explain fully the structure and operation of ‘eniaio lykeio’.
- There was not the necessary in-service training of the teachers in order to achieve the requirements of the new situation.
- The books and the other teaching means were out of the spirit of the new establishment.
- The vocational and technical directions were not selected from good students.

Having all those data, the Cyprus government proceed into a reform. Instead of changing the drawbacks, they cancelled the whole strategy and they tried to develop another direction.

From the school year 2000-2001 a new type of lyceum, named again as Eniaio Lykeio is employed on a pancyprian basis. That approach's major aim was to end or limit the prejudice against technical/vocational education. A second aim was to organise the education of upper secondary level according to current trends, especially to the European ones. Another priority was the expansion and modernisation of syllabuses and the improvement of the levels and methods of teaching and learning. The next aim was the creation of better response to economic, social and other needs of the country. Last but not least was the promotion of social cohesion with all pupils.

The Eniaio Lykeio was structured to provide common core subjects, compulsory to all students in the cycle (1st year), optional stream subjects chosen by the students from a list of subjects aiming to provide a thorough background in a sector of knowledge and enrichment or special interest subjects with major aim to satisfy special interests of the students and enriching their experiences. The following table gives a rough picture of the program organization.

TABLE 12*:* Eniaio Lykeio Structure

Grades Subjects	**Grade A**	**Grade B**	**Grade C**	**TOTAL**
Common Core Subjects	35 periods	19 periods	13 periods	67 periods
Optional stream Subjects	0	3 or 4 subjects	4 or 5 subjects	
Subjects of enrichment or special interest	0	0 or 2 subjects	1 or 3 subjects	
Total	**35 periods**	**35 periods**	**35 periods**	**105 periods**

In the year 2003 it was completed the whole three-year circle of upper - secondary education. Another committee undertook the task to evaluate the concepts of that reform. It had as president P. Pashiardis from the University of Cyprus and members M. Koutselini from the University of Cyprus, C. Hatzichristou from the University of Athens, A. Panayides Cyprus Ministry of Education, A. Michaelidou Pedagological Institute and C. Michael from Planning Bureau. The preliminary findings were announced on May 2003. The 'key' statements were the following:

- There was a gap between Grade A, Grade B and Grade C regarding the curriculum. The main reason was that 'Eniaio Lykeio' had started and the structure and content of Grade B and Grade C were not agreed.
- There were too many options in subjects (students can change subjects until the 15th of October) so that the teaching plan of each school is quite difficult to be obtained on time.
- After eight years, the problems with buildings, teaching means and books were there.
- The training of teachers was not adequate, especially with the New Technologies.
- The whole teaching procedure was engaged with the entrance exams in Universities of Cyprus and Greece.

The concept of Eniaio Lykeio, in one or another way, was a basic task for Cyprus education. However, that 'vehicle' had mechanical problems. Those problems were created due to wrong consideration of some important variables i.e. the basic stakeholders of education such as parents, teachers and the socio-political system.

Tsoukalas (1986) argues that Greek households are very much preoccupied with education. There is an educational fetishism according to which elder family members exercise a strong pressure on offspring to obtain a university certificate so that to be distinguished from the imperative of obtaining knowledge. Families do recognize that

employment prospects for university graduates have become drastically curtailed. However, they still believe that their offspring deserve a better fortune, as for example to fill a position in the low-salaried but secure public sector. For that reason the familial attitudes towards vocational education have been mostly negative. Vocational education has been generally viewed as an unpleasant alternative, useful only to the failures.

The cooperation of teachers and their unions are vital in any reform. The question is how enthusiastic were the teachers in those changes. OELMEK, the union of teachers of general secondary education supported Eniaio Lykeio without the unification of general and vocational education. In my opinion, the main reason for that position was the fear that students in technical schools have a lower academic level and the integration would affect the quality of studies. On the other hand, OLTEK, the union of teachers of vocational secondary education, wanted the general and vocational education to act separately, as the three year trial showed that the unification would be difficult. I believe that OLTEK members were against Eniaio Lykeio because they thought that they would lose some benefits such as less teaching hours and places for promotion.

The last, but in my view equally important factor, was the social and political system. Phillips and Furlong (2001) tried to analyze education policies by asking the following questions: What have been the major legislative reforms and structural changes which have influenced education policies over the past 25 years? What were the major ideological, political and educational factors which accounted for these changes? In what ways have certain areas of education been 'transformed' during this period? To what extent is there continuity with regard to education policy over the period as a whole? What have been the merits and demerits of these changes? In Cyprus, the reform of Eniaio Lykeio took place under the government of the right i.e. DISY. In the mid - point of their way they discovered that concept of educational reform in order to show to the voters that they had done something in education as well as to satisfy orders from Europe and UNESCO. They made changes to changes, without serious research and analysis, and they managed to keep the Cyprus education in the starting point. However, the opposition did not have a clear role in this situation. AKEL, the left party, did not support Eniaio

Lykeio as they believed that by sending students from lower socio - economic status in vocational education it would be obtained social reproduction and these students would be their future voters.

Technology is the key to the economic progress of developing and transition economies Technology and economic growth are strongly correlated in industrial countries (World Bank, 2003, p. 4). Based on this, the Eniaio Lykeio reform considered the certain direction.

So in parallel with the above changes, was the introduction of more technological subjects in Cyprus schools. The introduction of ICT in the Cyprus Educational System has been viewed as a matter of utmost priority by the Ministry of Education and Culture. Facts and figures indicate that in terms of technical infrastructure, the situation in Cyprus is satisfactory. Furthermore, the government has decided on connecting every school to the Internet. This has been implemented fully in upper secondary schools and partly in all other levels of education. At the secondary level of education, ICT is a part of the curriculum, in the form of subjects aiming at computer literacy and developing skills in the area and as a tool used for supporting other subjects or as a teaching aid. There is a general effort for promoting ICT in all the levels of education as tools in the teaching process, one initiative being the organization of training programs for teachers on the use of technology in the classroom.

Another technological subject which has been updated that period was Design and Technology. Design and technology education as part of general education in many countries, offers opportunities through designing and making activities, to enhance students' skills in several areas. Design and technology education in Cyprus was introduced in 1992 and replaced a craft based subject. Children were to be given the opportunity to 'design and make' products using different methods (electric/electronic circuits, mechanisms, pneumatics). The subject is compulsory for children in lower secondary school, age 11-14, and for the first grade of higher secondary school, age 15 and is optional for second and third grade of higher high school, age 16 and 17. If we

manage to bring together general secondary education with vocational secondary education probably more technological subjects will be engaged in the curriculum.

From the presentation of the above data, it can be said that vocational education is not in the first seat of the educational system. It has a supportive role and not the main role. Some measures were taken in order to solve a problematic situation and not to give a forward movement in order to achieve the development needs of the Cyprus economy and industry. Technical and vocational education was kept as an isolated education process. It is not attractive to students and parents whereas it is has been created an inequality in esteem between academic and vocational education which has to be overcome.

Under these conditions, the Republic of Cyprus has initiated an ambitious Educational Reform Programme, inviting dialogue with all stakeholders (political parties, teachers' unions, parents' associations, associations of students, and the Government, represented by the Ministry of Education and Culture and the Planning Bureau) with a view to turning the vision of a better and more modern educational system that will meet the needs and challenges of the 21st century, into reality. This dialogue was initiated in 2004 and some changes have been implemented since then, while others are currently under way.

In 2004, the Commission for Educational Reform (2004) was appointed by the Government (seven academics with Andreas Kazamias as a leader) to oversee the process of developing and implementing education reform in public schools. The Commission expressed concern about the narrowly ethnocentric and culturally monolithic Cypriot education system. The Educational Reform process was officially launched with the publication of a lengthy Report entitled Democratic and Humanistic Education in the Euro-Cypriot State: Potential for Reform and Modernization. That report made extensive reference to civic education and proposed its cross-curricular introduction to all levels of education and to the democratization of educational structures and contents. It also highlighted the European context as one of the most important reasons why reform was necessary. Unlike other official documentation, that Report castigated the Greek-

ethnocentric, Helleno-cyprio-centric and culturally monolithic character of Greek-Cypriot education. It thus caused heated debates as it directly challenged previous official policies of nationalism and patriotism and invited for a conscious shift towards Europe and the EU as a discursive source for more inclusive definitions of Cypriot citizenship which would enable students to participate in the cosmopolis of the EU as active and democratic citizens. It has caused also public debates and has been heavily criticized for its ideological positions, especially the Open University Group of Academics.

The philosophical background of this Reform was included in the key concepts of *Democratic and Human Education in the Euro Cypriot State of Justice*. The major goals of that Reform were:

- The transformation of Cypriot schools, not into the schools of a market economy, but into democratic schools for citizens.
- Public education, as a right for all.
- Social integration of all students and the struggle against social exclusion.
- Respect for difference, pluralism and multiple intelligence.
- Cultivation of skills that go further than the Society of Knowledge by itself.
- Education and learning centered on a neo-humanist education.
- Democratization in all aspects of education.

Kazamias, as a supporter of the left, suggested the reconsideration and reformation of the goals of Cypriot education. The ideological and political context of contemporary Cypriot education ignored the multiculturalism of the society, as well as the European and international character of education. As a result, that Reform proposed the transformation of Cypriot schools and the abolition of the market ideology, in order for an inclusive democracy to prevail including not only Greek Cypriots, but also the Turkish Cypriot community of Cyprus.

Amongst others, the Reform Committee proposed the extension of compulsory education from 9 to 12 years, the establishment of compulsory pre-primary education for a year before entrance to primary school, the gradual abolition of the dual network of the three

last years of Secondary Education and the establishment of a new type of Comprehensive Lyceum. In addition, school curricula would be revised according to the principles of intercultural education and participatory learning.

Many elements of the traditional Greek ethnocentric philosophy are still included in the main philosophy of the educational system, and for that reason the Committee proposed the establishment of a group of scientists, which will consist of Turkish Cypriots and Greek Cypriots, in order to revise the History textbooks. Furthermore, the Turkish language will be implemented in Lyceum, citizenship education will be reinforced and a program of neo-humanistic education would be formed.

In order to increase the efficiency of teaching, in a broader context than the context of the Society of Knowledge, the Committee suggested that new learning methods have to be implemented (i.e. project method); and the banking concept of knowledge has to be abolished.

The only examinations, covering the whole country, are those for entering Cyprus and Greek Universities. The Reform Committee report took a critical stance on the concept of National Standards which, in their opinion is tied to a consumerist view of education: goals are analyzed into objectives which are measurable and may thus be hierarchically ordered into levels by age and grade. The Committee rejected the view, to introduce National Standards into the educational system of Cyprus and proposes instead a *review of the Curriculum* to include in greater analysis and details not only the knowledge, but also the abilities, skills and attitudes expected to be attained by pupils. They define what students should know and be able to do in specific subject areas, but they do not prescribe what specific content students must learn.

Overall, though, it should be appreciated how radical this approach was, pointing to an inclusive approach to education that provided an invitation to Turkish Cypriots, thereby redefining the concept of an education for nation building. At the same time it rejected traditional rote learning methods (the banking concept taken from Paulo Freiere) and an

emphasis was given on new modes of learning which may address two of the points made in the first chapter - a focus on creativity through project work and crucially an attempt to address the academic - vocational divide through the establishment of a Comprehensive Lyceum.

The aims of these reforms seek to continue the link with the traditions of Cypriot education while bringing it into the 21st Century in the important ways just described. The question is how these aims have been translated into practice?

The Ministry of Education and Culture has sought to implement some measures consistent with this philosophy:

- More effective use of technologies in education.
- Adoption of modern teaching methods and means.
- The continuous training of teachers and the involvement of students in the learning process.
- The improvement of school premises
- The evaluation of the whole educational system, including that of teacher evaluation.
- The improvement of the appointment system.

The above trial remained at the margins of the education reform process, as it was not substantially reinitiated until the summer of 2008 (after a change of government in March 2008) to involve the development of new curricula for all subject-areas in both primary and secondary education, a process for which the philosophical and curricular foundations were presented in December 2008 with a document entitled Curriculum for the Public Schools of the Republic of Cyprus (2008). A document published between the previous two, entitled Strategic Planning for Education (MOEC 2007), also framed the reform as a necessity due to the changing needs of Cypriot society resulting from European and global challenges. Among other changes, it was planned that curricula would also be revised to promote, among other goals, active citizenship where political competence is one of the eight pillars of education with which pupils are expected to

develop the knowledge of the principles of social life, elements of legislation, and the development of individual responsibility.

As it is obtained from the previous analysis the 'key year' for this reform was 2008 with the advent of a new government. The first priority of the new government, in this phase of educational reform, was the modernization of the curriculum from pre-primary to secondary education. Curriculum change is a vital component of these educational reforms. The Christofias government created a committee with this major task. George Tsakalos, a professor from Aristoteleio University, Thesaloniki, is the leader. Sub-Committees for each subject have been set up and assigned with this task. Phase one of the task has already been completed. The committees submitted the curriculum in September 2010 and the next step concerns the consideration of the materials and their possible modification when and if the need arises. The most important change in the curricula is that the material taught becomes unified and cohesive which provides syllabus which outlines the framework to be followed rather than in detail. For that reason it is giving teachers more autonomy.

However, even here the past seems to be an obstruction since there is considerable resistance to their suggestions concerning the learning of history. The revised curriculum is aiming to help students develop into active citizens, to enhance their critical thinking and research capabilities, to include a variety of teaching methodologies and introduce flexibility in the school program, so that the teacher may use the most appropriate approach for the particular class. It remains to be seen if these attempts at revising the history syllabus and of giving teachers greater autonomy will succeed.

The establishment of the Centre of Educational Research and Evaluation (CERE) is a policy priority. Actually there is the title in the Ministry of Education but not the personnel. The CERE will carry out applied research into educational issues and practices. Also it will evaluate education programmes as well it will be used as a basis for the formulation and implementation of evidence-based education policy.

When these aspirations are considered it seems that Cyprus is moving in the right direction. However there is a question over how much of these reforms remain rhetoric rather than reality**.**

The school year 2009-2010 was planned to be used for the piloting of the revised curriculum materials. Many educators argue that in some cases the 'new' analytic programmes are a copy-paste of the old/existing analytic programme with some minor insertions. Another important point is that the next academic year will be in the middle of the presidential electoral campaign and there is a limited possibility for radical changes.

There is also in the atmosphere that the "new educational philosophy" has not been applied in the textbooks. That is a big problem as the theory will be far away from the practice. In parallel with this, is the employment of a new teaching program with the hours of study per subject in all the levels. The new curriculum has no meaning if its goals are not having their position in the students program of study.

For any educational change, in order to be successful, the training of the teachers has a great importance. The content as well as the organisational structure of the Cyprus in-service training does not satisfy the needs of school teachers to a great extent. The Committee on Educational Reform (2004), in their report mentioned that the in-service programmes can only satisfy a rather limited percentage of teachers (p. 238), due to lack of vision and planning.

Reform efforts in any educational system may only be successful with the cooperation and adequate preparation of teachers to implement the suggested innovations given that teachers' knowledge may affect students' learning and understanding of the material taught.

In the European Commission report (2010) for sustainable and inclusive growth - Europe 2020- teachers are acknowledged as key mediators for achieving structural change and innovation in education. However in many European countries, teachers are often the

forgotten agents in education reforms. That is the case in Cyprus, where unfortunately there is no systematic and coordinated program of teachers training in order to support this change. This is a big problem to the way to High skills formation according to Ashton and Green model (1996). They consider training as a 'side parameter' regarding education.

At this point is the time to mention one of the difficult operational problems of Cyprus educational system, the teachers' recruitment.

The teaching profession in elementary education in Cyprus is a popular career choice and competition for places in teaching programmes either at universities in Greece or at the University of Cyprus (entry through the National Pancyprian Exams) is high, thus ensuring that the highest achieving students are accepted to these programmes. The demand for student teaching positions is due in part to the security (lifetime tenure once a teacher is appointed within the national education system) and benefits (holidays, promotion, salary, and working hours) offered by the national education system.

At the pre-primary and primary level, teachers need to have a four-year BA degree in Educational studies. At the secondary level teachers need to have a BA in the particular area that they will be teaching and an additional year of pedagogical studies as part of their pre-service education. Cyprus has a unique system for teacher appointments where graduates in any field can add their name to a list and be appointed as a teacher at any point as their name moves up the list. It could even be 30 years later.

The Educational authorities realised that changes would have to be made to the system when the list recently reached record levels of over 35,600 names, having been fuelled by the addition of thousands of names of Greeks seeking teaching jobs in Cyprus as EU nationals. The education minister suggests the introduction of written examinations as a new measure to thin out the list. His suggestion is a point system having certain criteria such as, one point for every year spent on the waiting list, two points for every year spent

employed in recognised Cypriot private or public schools, ten points for a PhD and six points for a Master's Degree, as well as three points for every year spent in army service. However the teachers' union and the teacher wannabes have rejected this outright especially the point with written exams. So the whole situation is at standstill as unfortunately the ministry of education cannot afford the political cost. That is quite important as the basic qualifications and the training of teachers are the 'wheels' in the vehicle of successful educational reform. The crucial role of teachers is highlighted in a report of European Council. The Ministers of Education agreed that:

> High quality teaching is a prerequisite for high-quality education and training, which are in turn powerful determinants of Europe's long-term competitiveness and capacity to create more jobs and growth in line with the Lisbon goals (European Council, 2007, c. 300/7).

Having looked at the progress and direction of the educational reforms, I now turn to the key developments with respect to innovation.

7.3. INNOVATION

It will be recalled that in previous Chapters, it was suggested that there were some points that needed to be addressed, that came out of the discussion of the Triple Helix. These related to the contribution of the universities to innovation and will be dealt with after a discussing a report created by the INNO-Policy TrendChart dealing with Innovation Policy Progress Report of Cyprus at 2009.

Musyck and Hadjimanolis (2002) argue that Cyprus is a small state with a traditional industrial structure. The colonial past and the very short history of industrialization have shaped a weak national innovation system with limited research, especially in the private sector, few high-tech firms, and low levels of product innovation.

The innovation system of Cyprus has developed in the last decade and the accession to the EU was the driving force behind these changes. The main features of the national innovation system were shaped in 2005, following the Regional Innovation Strategy 2005-2008.That strategy had five pillars. The first one aimed to strengthen the Endogenous Capabilities of Enterprises to Engage in Innovative Activities as the innovation system (demand – supply – support) was weak. The second pillar was to bridge the gap between Industry and Academia / Research community. The third policy pillar was related to the improvement of Human Resources. The fourth pillar was involved with the development of Innovation funding mechanisms. The last one gave emphasis on Innovation culture and to increase awareness on R & D Issues.

In parallel with Innovation is Research and Development investment. It refers to both innovation with respect to products and also to processes.

Referring to the Cyprus Innovation Policy Progress Report (2009):

> Innovation policy has attracted more attention in the recent past without yet becoming a well-coordinated and effective part of the overall economic development policy. Progress is slow and only in few organisations lacking a pervasive character across all ministries. The mindset of government innovation remains too closely linked to research and technology only, while the business sectors view innovation much more as a process of non-technological change. This gap needs to be bridged with both the public sector addressing coordination and non-technological innovation and the business community investing more in technological innovation. Despite progress in R&D and innovation policy, the ambitious goals set towards the fulfilment of the quantitative and qualitative goals of the Lisbon Agenda have not been met. The majority of the measures … are criticised as slow and bureaucratic (p. 30).

Cyprus is classified by the European Innovation Scoreboard (EIS 2009) into the group of the innovation followers along with: Austria, Belgium, Estonia, France, Iceland, Ireland, Luxembourg, the Netherlands and Slovenia. Denmark, Finland, Germany, Sweden,

Switzerland and the UK are considered as the innovation leaders. That is very hopeful sign about Cyprus prospects in high skills knowledge.

According to the Innovation Policy Progress Report (2009) the main innovation policy challenges that Cyprus faces are as follows:

- **Increase inputs and efficiency of business innovation:** the business sector is still considerably under-investing in R&D and innovation. Measures fostering entrepreneurship as well as supporting university-industry cooperation and clusters are adopted in an effort to meet this challenge.
- **Increase the number of Science & Engineering graduates:** The number of S&E graduates is low due mainly to the late creation of universities on the island. The real challenge now will be to effectively employ the newly graduating scientists and engineers both in the research system and the business sector.
- **Make innovation policy and support to innovation more effective:** Innovation policy has evolved rapidly but in a rather fragmented way (p.i).

In order to make the innovation policy more effective, Hadjimanolis (2010) suggests the following framework for a Strategy to Promote Innovation Culture. The framework consists of 10 steps. More specifically:

Step 1	Developing long-term vision
Step 2	Determining exchange actors
Step 3	Objectives of parties involved
Step 4	Determination of values to be exchanged
Step 5	Conducting market research
Step 6	Designing the marketing strategy
Step 7	Market segmentation
Step 8	Design of communication tools

Step 9 Implementation

Step 10 Evaluation

The main advantage of the above method is the systematic approach to the problem of innovation policy which gives clear guidelines to public sector officials to promote efficiency and effectiveness. This marketing approach is an advantage in a small country like Cyprus where the stakeholders in innovation policy are easily in contact. Hadjimanolis (2010) argues that:

> Cultivating relationships with intermediaries, such as chambers of commerce and professional associations, and final users of innovation services, such as small firms, will gradually develop a dense policy network. Innovation policy will be formed with a democratic procedure within the network through exchange of views and based on the actual needs and wants of the users innovation actors (p.107).

The problem with the Innovation policy is that progress is slow although the government shows more attention and is contributing more funds in this area. Gross domestic expenditure on R&D increased to €73.4 mln in 2008, which accounts for 0.42% of GDP, compared to €70.1 mln and 0.44% in 2007. This percentage ranks Cyprus last among the EU members, despite its efforts to increase considerably its expenditure in absolute figures, at a record 12% average annual growth during the last five years; one of the highest rates in the EU.

However, as we have seen, Cyprus is dominated by small firms and this raises fundamental problems in terms of their capacity to utilise both product and process innovations. This relates to another aspect of the problem. There is a disparity between the public and private sectors. For the government innovation remains closely linked to research and technology while the business sectors see innovation mainly as a process on non-technological change. This gap needs to be bridged. Innovation is central to economic competitiveness and part of the success is its integration with technology and business.

The government is committed to achieving high skill formation and for that reason is trying to encourage employers to be committed to the same route. Referring again to the above report the applied policy does not fulfill the goals set by the government and directed by the Lisbon agenda. In part this is because many of the measures are characterized as bureaucratic i.e. innovation is restricted to the allocation of research grants.

An exception is creation of the ‘Mediation Centres for Research and Innovation’. Their target is the design of the intermediation mechanism between SMEs and research organisations. On the same logic the 'Thematic Innovation Networks' aim directly at the creation of the cooperation networks between enterprises, research institutions and intermediate bodies

A characteristic example of this practice is the Ex. Rector of the University of Cyprus (UoC) Stavros Zenios who highlights the importance of innovation as the main lever that strengthens the competitiveness of a country, region or city. Zenios is a supporter of the triple helix model. It has the belief that cooperation of companies, governments and universities for innovation has to be encouraged so that the competitiveness of a region to be strengthened. For that reason he has proposed to establish the Region of Knowledge of Nicosia. In this trial Zenios has the support of the Mayors of major Nicosia, Cyprus Employers and Industrialists Federation (OEB) and the Cyprus Chamber of Commerce and Industry (CCCI). His task is to make Nicosia an area of intense activity, research knowledge innovation and economic development.

Gault and Huttner (2008) argue that the dynamic and complex nature of innovation requires a systems approach to analyse both it and the policies that influence it. All the actors - governments, businesses, institutions of education, foreign institutions and more - need to be included in the analysis. For that reason it is necessary to develop and monitor a broader set of indicators beyond the quantitative ones traditionally used not only to appraise performance but also as ‘targets’ for Governments to meet. Those could be the

development of indicators and metrics that improve the ability to understand the performance of institutions and linkages between the actors of innovation systems.

Unfortunately this parameter is not considered in Cypriot Innovation Policy. Also the view of Viale and Etzkowitz (2010) about innovation is absent (even the trial of Zenios) i.e. the capitalization of knowledge. Their triple helix model, suggests that a co-evolving network of communication between three types of institution: universities, industry and government is vital. Central to this model is research.

7.4. RESEARCH

The basis of this analysis is a report prepared by ERAWATCH regarding Cyprus for the year 2009. ERAWATCH is a joint initiative of the European Commission's Directorates General for Research and Joint Research Centre.

A basic characteristic of Cyprus profile is the advanced educational level and its highly qualified working force. However, high tech manufacturing and R&D intensity remain at low levels mainly due to the low level of public and business R&D funding, the dominance of low technology, low competitiveness levels and small firms with limited involvement in innovative and R&D activities, the small size of the economy, the labour force and the domestic market.

Universities are in the centre - stage of the knowledge as the prime producers of knowledge. According to the ERAWATCH Cyprus Report 2009, there is a limited specialization in internationally growing sectors. However, I should also point to some successes. Professor Pissarides is Professor of Economics at LSE and holder of the Norman Snow Chair in Economics. He won the 2010 Nobel prize for his work on the economics of unemployment, especially job flows and the effects of being out of work. Professor Pissarides as a Cypriot will provide expertise and prestige to the Higher education sector in Cyprus. Another good example is the work of Philippos Patsalis, chief

executive medical director of the Cyprus Institute of Neurology and Genetics in Nicosia regarding a simple blood test that it will offer a safe way to detect Down syndrome during pregnancy.

Although there are these examples, the key point is that knowledge does not, typically, circulate between research organizations and the business sector. There is a low demand and lack of targeted supply along with a climate of mistrust. The establishment and operation of the Technical University of Cyprus (TEPAK) as well the development of engineering schools in the other Universities (public and private) were important steps towards tackling the apparent lack of knowledge production. In the same line are the establishment of National Council for Research and Innovation and the Cyprus Science Council which are expected to improve coordination of implementation mechanisms and better focus on research priorities.

Higher Education has a short history in Cyprus. The University of Cyprus was the first to be established in the mid ‘90s. The Open University followed and the Technical University started operating in 2008. The Colleges were recently upgraded to university status. This means that the research in universities, under these circumstances, is limited.

This fact rules out one necessary condition for the creation of High skills knowledge as it is presented by Tickly et al. (2003) i.e. to develop a program of research and consultancy to support the development of a skills development strategy. This ought to involve building capacity for indigenous researchers and consultants.

The Ministry of Education and Culture is making a movement to the correct direction by trying to develop the provision of PhD courses in the private universities. They realise the need for indigenous PhD programmes to cover the future educational needs of Cyprus. One barrier faced is the lack of motivation on the part of industry to support PhD research programmes in the private universities partly as there is a lack of interest from industry to undertake such research.

The structure of the business sector in Cyprus does not favour research. There are no big multinationals with headquarters on the island and even the biggest among national companies are effectively SMEs by European criteria. The majority of SMEs are very small family-based companies. The explanation for the low demand for knowledge and innovation is that the sectoral structure of the economy which is dominated by the service sector (tourism and finance) with manufacturing representing only a small fraction. Another fact is the lack of awareness among the business community for the importance of R&D. There is no systematic university-industry linkage. The business and the academic sectors act independently and in parallel in Cyprus.

However, there is a constant increase to the number of Human Resources in Science and Technology (HRST). That is obtained from the following table.

TABLE 13: Human Resources in Science and Technology (HRST)

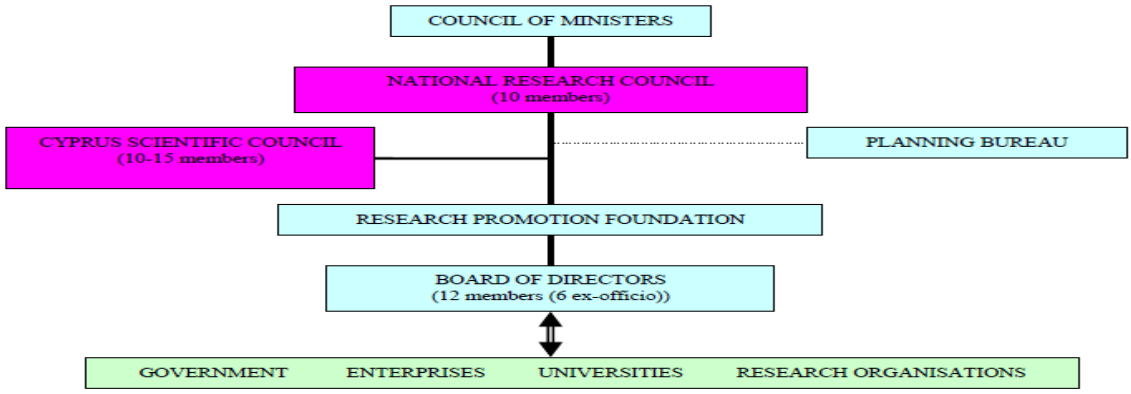
	1991	**1998**	**2004**	**2005**	**2006**	**2007**
Human Resources for S&T (FTE)	341	564	1107	1,157	1,226	1,244
Annual increase	-	-	*10.3%*	*13.8%*	*6.0%*	*1.5%*
Researchers (FTE)	135	237	583	682	748	799
Annual increase	-	-	*19.0%*	*17.0%*	*9.7%*	*6.8%*

Source: ERA (2009)

An important parameter regarding research is the Research Promotion Foundation (RPF). RPF is an independent organization which was established in 1996 as an initiative of the Government of the Republic of Cyprus, to promote the development of scientific and technological research and innovation in Cyprus. RPF's main activities include the development and management of National Research Programs for the support of research and innovation activities, the promotion and encouragement of the participation of Cyprus in European Research Programs and the support of the

development of research infrastructure in the country. In the following figure is presented the structure of research activities in Cyprus.

FIGURE 2: Cyprus Research System



Source **: Policy Mix Peer Review: Cyprus (2009)**

The above model highlights the problem of coordination between the several bodies. The Planning Bureau is the lead agency with responsibility for research policy design and the Research Promotion Foundation (RPF) is responsible for policy implementation.

The Ministry of Commerce, Industry and Tourism (MCIT) is responsible for industrial policy, including the promotion of technology and entrepreneurship. Although the promotion of innovation resides with MCIT, it is actually undertaken by the RPF. Due to the absence of a specific minister for research Cyprus is represented in the European forums either by the Minister of Finance or the Minister of Commerce, Industry and Tourism. That is a point where it is required better coordination and cooperation. The paradox is that the Ministry of Education and Culture has never been actively involved in either research or innovation.

An important offer of the RPF, to the creation of High skills knowledge, is the organization of scientific competitions between education organizations for the promotion of research and innovation i.e. MEPA and TEKE.

The main research funding program (under RPF) is the DESMI. Through DESMI, the RPF provides funding for Cypriot participation in EU and other international RTDI Programs. The structure of DESMI has five main pillars:

1. Strategic and Thematic Research: Support for multi-thematic research programmes in Technology, IT and ICT, Sustainable Development, Health and Biotechnology and Economic and Social Sciences.
2. Human Capital Development: Support for young researchers (towards the development of a research and innovation culture) and for PhD candidates: Young Researchers – PENEK and PostDoc.
3. Research and Innovation for Enterprise: Industrial sector funding, comprising: Research by enterprises (especially SMEs), Eureka Cyprus and Innovation.
4. Development of research infrastructures: Creation, upgrading and maintenance of research infrastructures: New infrastructure, upgrade of existing infrastructure and access to infrastructure abroad.
5. International networking and cooperation: RTDI activities: Bilateral cooperation, international cooperation and attraction of researchers based abroad.

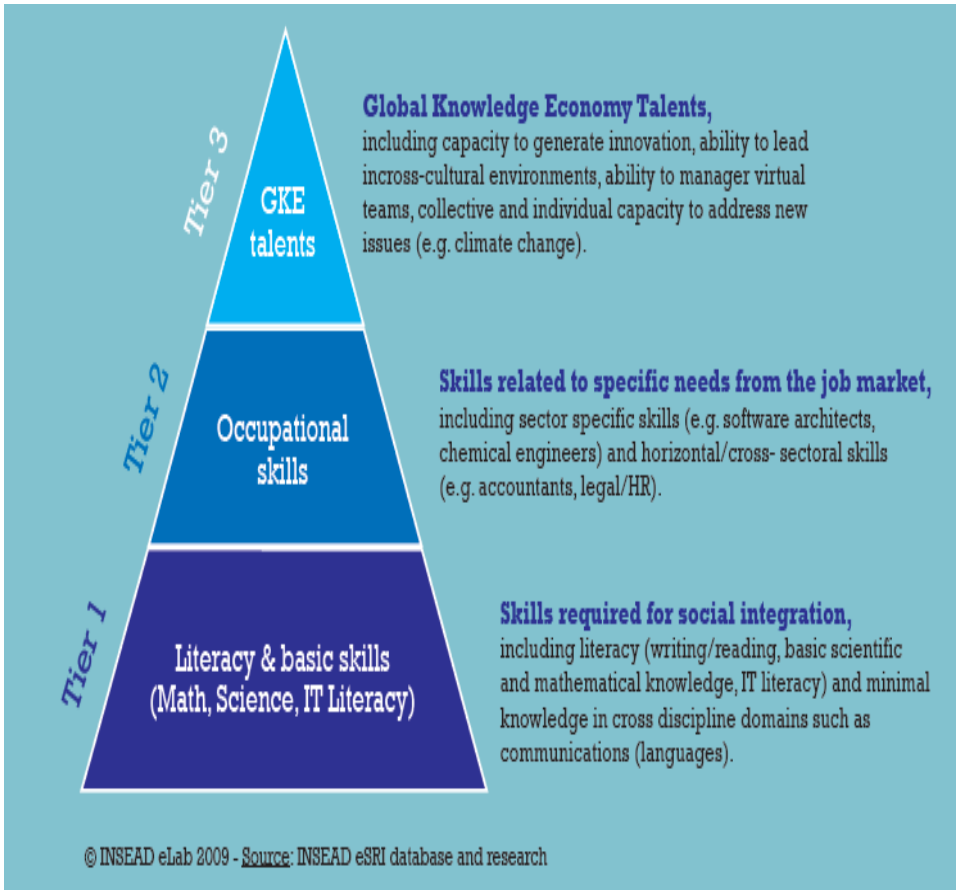
The economic crisis of 2008 may prove to be a turning point for research and innovation policy in Western countries, with apparently contradictory effects. It is the national government that will have to play the role of the white knight to save the R&D system in Western economies according to Etzkowitz and Ranga (2009). The triple helix is a model for capitalizing knowledge in order to pursue innovation. The transformation of the university from a teaching institution into one that combines teaching with research is very important. The combination of two is productive and more cost- effective i.e. linking research to the PhD training process. For Viale and Etzkowitz (2010), a key part of this process is that where there is increasing integration between basic science research and technology. However, in Cyprus at the moment, this is not a case as Technical University

of Cyprus (TEPAK) as well the development of engineering schools in the other Universities are in the initial stage.

So far we have looked at three key 'actors' in the development of a high skills economy: education, innovation policy and research. In all three cases there are serious problems that need to be addressed if Cyprus is to progress on this route.

The situation in Cyprus can be summed up using the only measurable model giving reference to Cyprus status, the INSEAD eLab team report (2009), which presents the Europe skills pyramid model (as shown to the following figure 5 and figure 6). This report is useful because it provides firstly an ideal-type account of what is necessary in the development of a high skills economy and then a set of indicators which place Cyprus on a scale with other countries.

FIGURE 3: Europe's skills pyramid: Definitions



In this pyramid at the bottom are the basic skills regarding Literacy, Maths and Information Technology. In the middle are skills created from the needs from the job market whereas on the top are the global knowledge skills required to generate innovation. The last ones is the major task in the 21st century.

FIGURE 4: **The framework used by INSEAD ELAB**

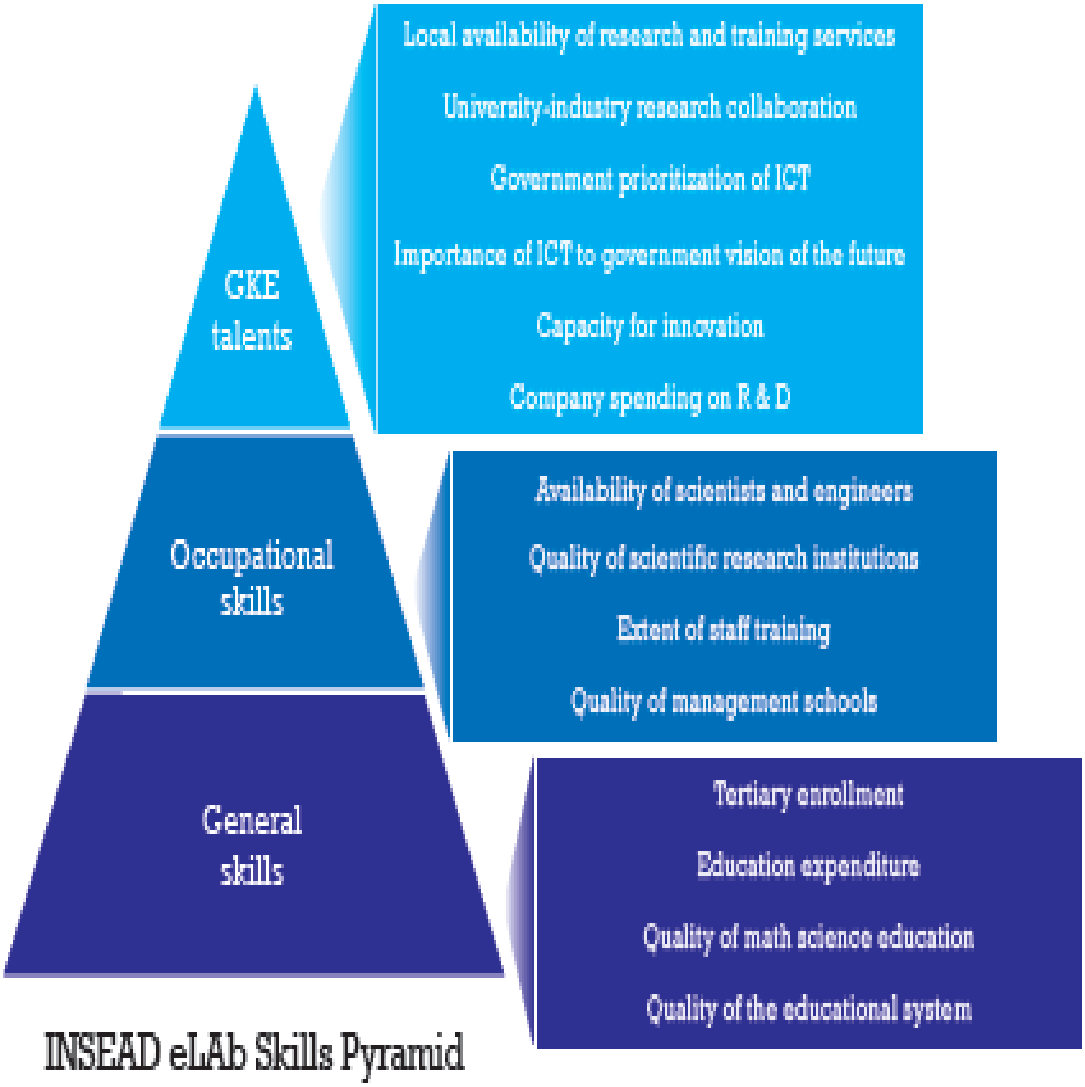


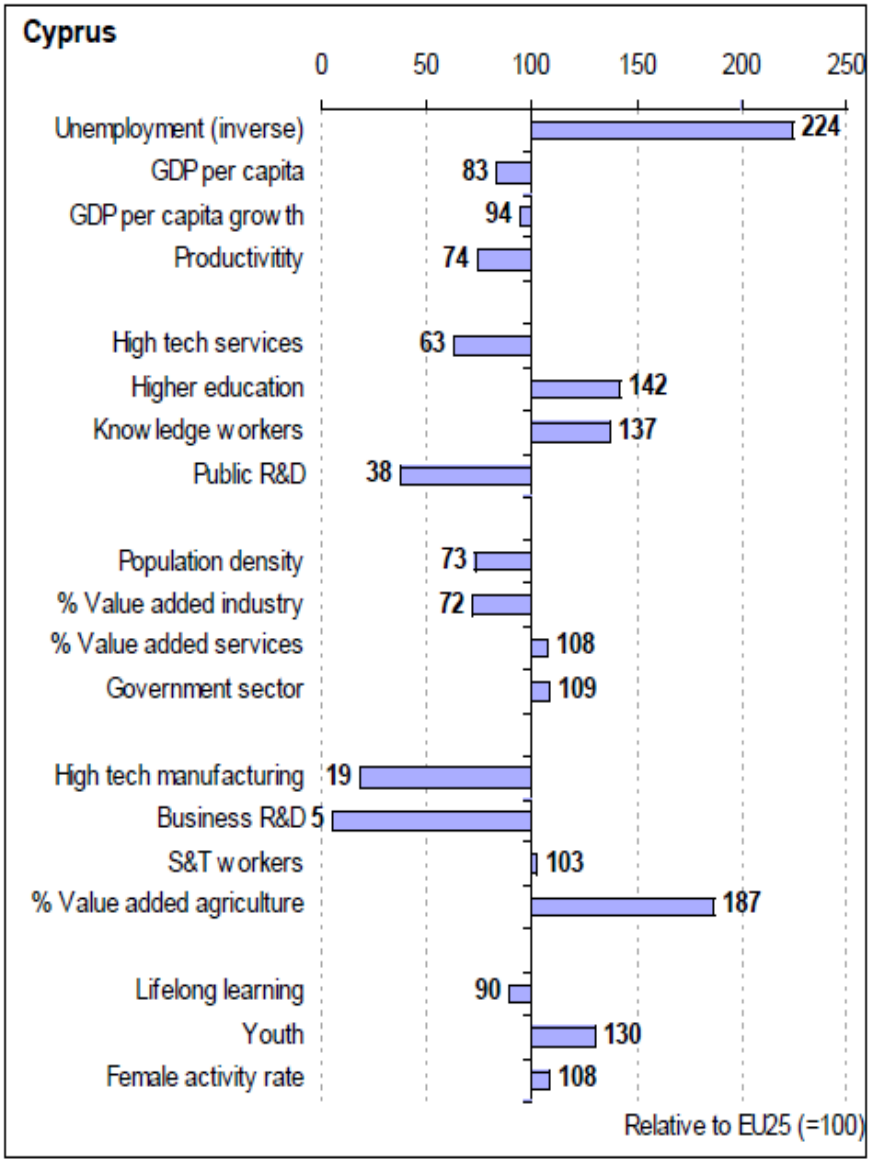
TABLE 14: Skills pyramid research results: scores, rankings and grades

Skills Pyramid Score ranking and grading of European Union countries and 15 other countries (n=42)

RANKING	COUNTRY	SCORE	GRADE	RANKING	COUNTRY	SCORE	GRADE
1	Finland	5.76	A	26	Spain	4.25	D
2	Denmark	5.76	A	27	Latvia	4.15	D
3	Sweden	5.70	A	28	Malta	4.12	D
4	Switzerland	5.49	B	29	Poland	4.07	D
5	United States	5.43	B	30	Cyprus	4.06	D
6	Korea	5.39	B	31	Luxembourg	4.06	D
7	Norway	5.24	B	32	Slovakia	4.03	D
8	Singapore	5.23	B	33	Italy	4.02	D
9	Belgium	5.18	B	34	Greece	3.99	D
10	Canada	5.15	B	35	Russia	3.99	D
11	Netherlands	5.15	B	36	Ukraine	3.89	D
12	Germany	5.11	B	37	Turkey	3.86	D
13	France	5.09	B	38	Romania	3.79	D
14	United Kingdom	5.07	B	39	Brazil	3.71	D
15	Austria	5.05	B	40	China	3.71	D
16	Ireland	5.02	B	41	Mexico	3.64	D
17	Japan	5.01	B	42	Bulgaria	3.58	F
18	Hong Kong SAR	4.73	C				
19	Estonia	4.69	C				
-	EU 27	4.59	C				
20	Slovenia	4.57	C				
21	India	4.51	C				
22	Czech Republic	4.50	C				
23	Lithuania	4.47	C				
24	Portugal	4.38	C				
25	Hungary	4.34	C				

The above table shows Cyprus to be in 30th position in this skills policy pyramid. Given the discussion above, this will not come as a surprise, which can be elaborated upon in the light of the figure below.

FIGURE 5: **Cyprus performance for key knowledge economy indicators**



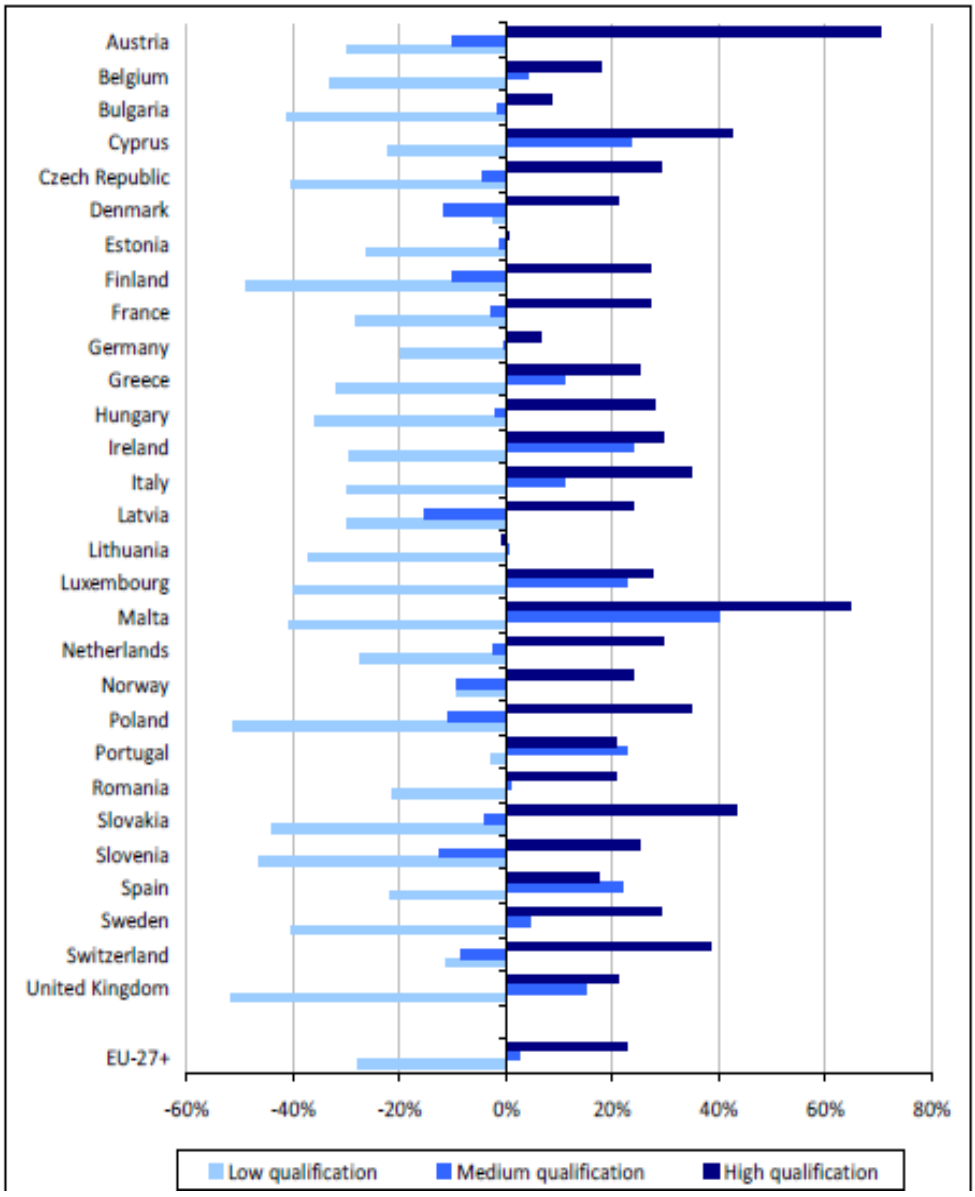
Source: Cyprus report to European commission (2006)

The figure is centered on a baseline of 100 in comparing Cyprus to other EU countries. However for my purposes the focus is on the strengths and weaknesses in Cyprus. The main characteristics of the labour dynamic is first the overall labor force participation, even though still higher than the EU average, it exhibits a declining trend; female labor force participation, despite a rising trend, remains below the corresponding EU average. Second, the rate of unemployment remains relatively low and a number of structural

features of unemployment are a matter of concern: a rising share of long-term unemployment in total unemployment; a higher unemployment rate among women than among men; relatively high unemployment among newcomers to the labor market. There are also inequalities of opportunity as between women and men in the labor market, as reflected in higher female unemployment (particularly long term unemployment), in a gender pay gap and an unbalanced representation of women across sectors and occupations. Another important fact is that quantitative and qualitative imbalances are reflected in mismatches between demand and supply in a number of occupations and the significant presence of foreign workers in the Cypriot labor market. Internal labor mobility appears low.

The figure 6 below shows the projections regarding qualifications in several European countries. In all countries the highly qualified workforce is projected to be greater in 2020 than in 2010. In contrast, people with low (or no) qualifications are projected to be less. Especially for Cyprus the projected increase for high qualifications workforce is nearly 40% whereas the fall in low qualifications is projected to be about 20%. That is good sign for Cyprus labour market.

FIGURE 6: Projected change (in %) in labour force by qualification and country, 2010-20



Source: Cedefop (2009) - IER estimates

Even though the above indications are important, they will not alarm the policy makers and the other stakeholders in Cyprus community. Educational achievement and performance is a very sensitive area. When the education outcomes are not those would be expected, the educational policy makers are in 'fire'. That is the reason why I will present the performance in international test like TIMSS. The Ministry of Education is

covered behind the 8% of GDP spending in education (one of the highest in Europe) but what is the real truth?

Salhberg (2011) has the view that:

> International tests comparing what students knew had existed for a long time by then, there was not a commonly accepted index to compare the educational performance of nations and jurisdictions as there is today. Many countries knew they had world-class schools, and some thought their education system was better than anybody else's. At that time, the quality of educational systems was often determined by students' performance in international competitions such as academic Olympiads for high school students (in mathematics, physics, chemistry, and computer science), national enrolment and graduation statistics, or simply by the good reputation that country had in other fields like research, industry, commerce, or innovation (p.3).

Nevertheless, I will concentrate to the thinking above. I will deal with TIMSS results. TIMSS, the Trends in International Mathematics and Science Study, is designed to help countries all over the world improve student learning in mathematics and science. Approximately 50 countries from all over the world participate in TIMSS.

Referring to **Appendices 1** and **2** it can be obtained a summary for the results from the TIMSS 2007 research. As it is seen from those tables for both Mathematics and Science the scores of Cyprus are very low and far away from the average. On the top are the countries East Asia who belong to High Skills - Low Wages community. That is a very important point even though many educators in Cyprus are not supportive to TIMSS methodology.

A more reliable tool is considered a program from the Organisation for Economic Cooperation and Development (OECD) named as PISA (Programme for International Student Assessment). PISA is used to compare the performance of education systems. It seeks to measure student competency in core subjects needed to operate in modern democratic societies and knowledge-based economies. PISA assesses the pupils'

knowledge and skills that they have acquired in or out of school. We have no results regarding Cyprus as it will participate to PISA for the first time the next year.

Let's go back to the initial thinking. The above results are not the appropriate instruments for the High Skills theory measurement. They are just signals and alarms that the educational system of Cyprus is not effective.

A quantitative indication regarding skills measurement will be offered by OECD in the near future. It is the Programme for the International Assessment of Adult Competencies (PIAAC). Referring to OECD (2008) report PIAAC is the most comprehensive international survey of adult skills ever undertaken. It is collaboration between governments, an international consortium of organisations and the OECD. It will take place across OECD and partner countries in 2011 with results published in 2013. PIAAC will measure the skills and competencies needed for individuals to participate in society and for economies to prosper. Its major task is to help governments better understand how education and training systems can nurture these skills. The survey will involve interviews with adults aged 16-65 years (5 000 in each participating country). It will also assess the literacy and numeracy skills and the ability to solve problems in technology-rich environments.

Unfortunately Cyprus is not participating in this research. That is a drawback as there will be no comparative measurement regarding skills formation.

Angel Gurría, OECD Secretary-General, states that:

> Knowledge and skills are the most valuable assets to present and future generations, as governments seek to maintain global competitiveness, increase the flexibility and responsiveness of labour markets and deal with issues of population ageing. OECD's breakthrough survey on adult competencies, PIAAC, will provide governments with a unique and effective tool to assess where they stand in terms of the quantity and quality of the knowledge and skills of their workforce. Equally important, it will provide insights into how skills relate to the social and economic well-being of individuals and nations

> and also benchmark how effectively education and training systems meet emerging skill demands (OECD, 2008, p.1).

Under these conditions the police makers in Cyprus have only one way, to follow 'the river'. We have to understand that there is no space for educational protectionism! Psifidou (2010) is supportive to my view as in that way the governments will obtain better control of public funding of education.

From the analysis of innovation, research and education in Cyprus (based on the official documents mentioned earlier) it is obvious that my country has a long way to cover in relation to high skills knowledge. My position is supported by a recent document published in April 2011 i.e. Cyprus National Reform Programme 2011, Europe 2020 Strategy for: Smart, Sustainable and Inclusive Growth.

The National Reform Programme (NRP) 2011 presents the structural reforms that aim to boost growth, employment and social cohesion. The key challenge is to increase labour market participation and create employment opportunities for the relatively highly skilled workforce. Another area of interest is the promotion of innovation, ICT and new technology usage capacity as there is at the moment a limited capacity for Cyprus to increase R&D. So efforts will be made to guide the increasing involvement of business in innovation activities and the upgrading of their technology usage capacity.

It should be emphasised that although I have focussed on what may be seen as the key weaknesses in developing a high skill route in Cyprus, there is considerable government intervention and many initiatives that are being undertaken. The table below documents these and their relevance will be seen in the light of the discussion so far.

In the following tables are summarised the measures to improve Education and training as well labour market participation referring again to National Reform Program 2011.

TABLE 15: Measures to improve Education and training systems (NRP 2011, p.69)

Name of measure	Policy Area	Competent Authority	Description	Implementation Period	Budget - ESF Contribution	Internal monitoring system	Quantitative Target
Employment and Social Integration of Persons from Vulnerable Groups	Improve Education and Training Systems	Social Welfare Services (SWS)	The SWS will implement a programme for improving the social skills of the Vulnerable. On the basis of their needs they may participate in specialised skill training and or educational programmes. Additionally they will be directed to the PES to be promoted for employment	February 2011 – September 2015	€2.000.000 Co-financed by ESF (70%) and the Cyprus Government (30%)	Ex-post evaluation by independent expert and internal on-going monitoring	1.300 people from vulnerable groups of the population
"e-Volve"	Improve Education and Training Systems	Cyprus Productivity Centre (CPC)	A training and consultancy scheme for companies and organisations designed to provide them with the necessary support in order to improve the level of their e-Learning, e-Government and e-Business skills.	September 2009 – December 2013	€1 mln Co-financed by ESF (85%) and the Cyprus Government (15%)	Developed according to ESF rules, approved by the ESF Unit of the Min. of Labour & Social Insurance and described in the Project Fiche.	1.500 individuals 1000 enterprises 125 training programmes 10 preparatory training programmes 8 specialised seminars in e-Commerce 24 seminars in 8 specialised e-business topics.
Survey on "Identification of the technical vocational training needs of Cypriot enterprises"	Improve education and training systems	Cyprus Productivity Center (CPC)	The survey aimed at investigating and identifying the training needs of Cypriot enterprises for technical vocational training.	November 2009 - November 2010	€32.200		
Survey on "The attractiveness of VET in Cyprus"	Improve education and training systems	Cyprus Productivity Center (CPC)	The aim of this survey, which was carried out among young students in their last compulsory school year, is to investigate the factors causing the low participation in VET in Cyprus, and to explore and test measures and policies that can correct this negative situation.	April 2009 - December 2010	€5.000		

TABLE 16: Measures to increase labour market participation (NRP 2011, p. 62)

Name of measure	Policy Area	Competent Authority	Description	Implementation Period	Budget - ESF Contribution	Internal monitoring system	Quantitative Target
Scheme for the improvement of the employability of economically inactive women	Increase labour market participation	Human Resource Develo-pment Authority (HRDA)	The scheme aims at the improvement of the employability of the economically inactive women through offering opportunities for participation in training activities and work experience. The scheme offers opportunities for participation in training programmes on information technology, English language and secretarial skills, as well as work experience programmes in enterprises of 8-10 weeks duration.	2010 – 2014	€4.000.000 Co-financed by ESF (70%) and HRDA (30%) as National contribution		1.500 women
Scheme for the improvement of the employability of the unemployed	Increase labour market participation	Human Resource Develo-pment Authority (HRDA)	The scheme aims at the improvement of the employability of the unemployed through offering opportunities for participation in training activities and work experience. The scheme offers opportunities for participation in training programmes on information technology, English language and secretarial skills, as well as work experience programmes in enterprises of 8-10 weeks duration.	2010 – 2014	€8.000.000 Co-financed by ESF (70%) and HRDA (30%) as National contribution		2.200 unemployed
Job placement and training of unemployed tertiary education young graduates	Increase labour market participation	Human Resource Develo-pment Authority (HRDA)	This scheme aims at strengthening the management capacity of enterprises and organisations through the employment and training of young university and other tertiary education graduates. The measure provides incentives to enterprises to provide employment, practical training and work experience to young graduates. HRDA provides subsidies to employers for the delivery of in-house training programmes to young graduates (6 or 12 months duration). The in-house training of graduates is enhanced by the participation in other training courses, aiming at specialising and fulfilling their knowledge.	On going	€5.100.000 for 2011		600 persons in 2011

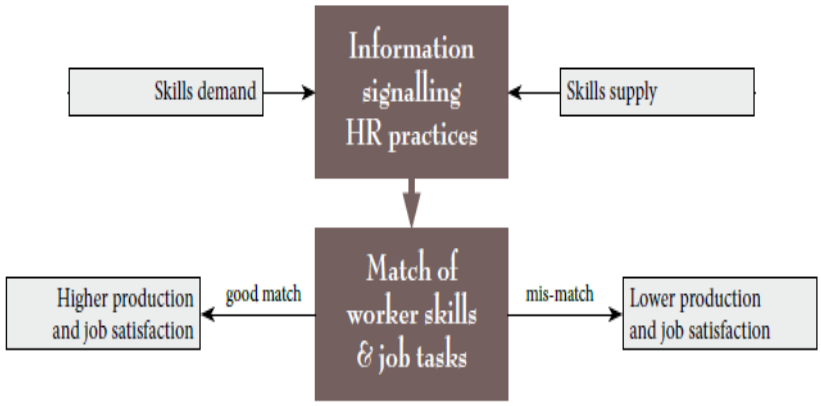
It can be seen from this range of interventions that the state is highly active in seeking to promote both employment and to raise the levels of skill with respect to employment. A successful skills strategy is that one which better match skills supply with demand. However, most of these initiatives mentioned earlier relate to supply side policies and there is far less with respect to government intervention on the demand side.

OECD report on skills strategy (2011) argues that:

> The focus of skills policies is often on the supply side – on increasing the stock of available skills through education and training, migration and activation. However, more skills are not necessarily better skills, and the mere existence of skills does not automatically lead to improved economic performance. Making optimal use of existing skills, preventing waste and attrition of skills due to mismatch or lack of use, and encouraging employers to demand higher level of skills in stagnating regions or sectors are equally important elements of skills policies. Under-utilisation of skills – either because of a mismatch between workers' skills and those demanded by the job or because individuals are out of the labour market all together – represents a waste of the resources (p.19).

The following figure presents an instrument to balance (in some degree); the skills supply with skills demand.

FIGURE 7: **Matching skills supply with demand**



Source: OECD (2011, p.20)

OECD report on skills strategy (2011) states that:

> Direct flows of information between labour markets and skills-formation systems are needed to ensure that the skills developed are the ones needed by the economy and can be employed efficiently. Information is needed by all concerned: students who choose careers and seek employers requiring the skills they posses; workers who want to upgrade their skills to boost their careers and make the most of their talent; unemployed people who want to get back into the labour market; firms that are looking for the right skills; and governments that design education programmes and make investment choices (p.20).

Based on the above argument one obvious candidate for a greater focus on the demand side is Tourism. It has been the leading growth sector in the economy since 1980 and now constitutes the backbone of the economy. Ever since the country's independence in 1960, the Government of the Republic has accorded a high degree of priority to tourism development. At present, Cyprus hosts more than two million tourists every year. The Cyprus tourism industry has been long established and has by now reached a mature stage. International and peripheral competition is getting intense and the needs of the educated traveller becoming increasingly more diverse and sophisticated. It is necessary to invest to special tourism i.e. educational seminars, scientific events and exhibitions and utilising the Island's rich history. It is often thought that tourism has to remain a low skill industry but educational tourism would raise the level of skills, at least for some workers.

In addition, there are other growth areas that need innovation to raise skill levels and the numbers employed. These include: telecommunications, attracting offshore companies, especially with respect to the Cypriot strength in the banking sector, and the development of light industry (e.g. software engineering).

It is beyond the framework of this thesis to go into greater detail regarding the demand side but hopefully enough has been said concerning the possibilities.
In the next chapter I will consider an external evaluation carried out by a European team and an internal evaluation by a group of Cypriot researchers regarding the High Skills environment in Cyprus.

CHAPTER EIGHT

EXTERNAL / INTERNAL EVALUATION OF CYPRUS WAY TO HIGH SKILLS ECONOMY

In this chapter I will try to codify the results both of an external evaluation and internal evaluation of Cyprus current situation regarding High Skills knowledge.

As it is said in Methodology chapter, normally the best way to assess the High Skills environment is to interview a number of the key policy makers and players in education and business. These persons could be the minister of education, a representative of economic sector, a representative of labour sector, a representative of planning bureau, a representative of higher education as well a representative of teacher unions. However, I choose a different method instead of the evaluation using structured interviews.

As it is obtained from the previous chapter many points of the ongoing reforms remain rhetoric rather than reality. For that reason I have the strong belief that an independent external evaluation or internal evaluation is more reliable instrument.

For thesis purposes, I will deal with the evaluation carried out by an expert group appointed by CREST – the European Union committee for scientific and technical research. It is employed the *Open Method of Coordination* (OMC). This method was designed to guide Member States to the reforms they needed to undertake in order to reach the Lisbon goals. The method included instruments like fixing guidelines and timetables, establishing quantitative and qualitative indicators and benchmarks, translating European guidelines into national and regional policies and periodic monitoring of the progress achieved.

The Cyprus report has been produced by Policy Mix Peer Reviews team in favour of the 3% GDP European target for research. The report represented the outcomes of a visit made by the

members of the Peer Review team to Cyprus between 22nd and 25th November 2009 and it was prepared by Paul Cunningham from Manchester Institute of Innovation Research, University of Manchester.

The data for this project were obtained through interviews with the major players of Research Technological Development and Innovation (RTDI) System of Cyprus. There were six sets of interviews. More specifically *Interview 1* covered RTDI strategy and development with Mr Costas Iacovou, Director of Planning, in Planning Bureau to be one of the persons to be interviewed. *Interview 2* looked for the Research and innovation funding and Mr Leonidas Antoniou, Acting Director in Research Promotion Foundation was one of the persons to be conducted. Mr Marios Tsiakkis, Deputy Secretary General, Cyprus Chamber of Commerce and Industry was one of the Industry representatives participated in the *Interview 3*. *Interview 4* covered Education, Human Resources Development and Research Organisations. Ms Despina Martidou-Forcier, Chief education officer, Ministry of Education and Culture and Mr Yiannis Mourouzides, Senior Human Resources Officer, Human Resources Development Authority were characteristic representatives. *Interview 5* checked in depth the Commerce, Industry and Tourism and IPR issues with Mr Spyros Zavros, Senior Officer, Ministry of Commerce, Industry and Tourism to be involved. The last interviews looked for the higher education sector. They were involved among others Professor Costas Christofides, Vice-Rector, University of Cyprus and Professor Kostas Gouliamos, Vice-Rector for Research, European University of Cyprus.

The questions used in the interviews are presented in the final report prepared by Cunningham (2009). The most characteristics were:

- How Cyprus might develop a research tradition, both in the public and political mind-set.
- How to address critical mass limitations for research in Cyprus … and how to improve the concentration of research activities and develop supporting infrastructures accordingly, in order to reduce the fragmentation of research.
- How to overcome the shortage of basic infrastructures for research and develop research support services, using the new funding streams that are now becoming available.

- How to enhance the levels of R&D interaction and knowledge exchange between the public and private sectors.
- How to introduce and use policy tools that can promote a real dialogue between industry and academia and the creation and survival chances of start-up and spin-off companies.
- How to link existing sectors of the economy and social policy with new/advanced technologies and scientific knowledge and to develop new economic activities out of this knowledge.
- How improvements made to the RDTI governance system in Cyprus may be accelerated and the effectiveness of the proposed bodies increased (p. 7-8).

The major finding of this evaluation, based on Policy Mix Peer Reviews report prepared by Cunningham (2009), is that Cyprus has made progress in building a research system and in creating a vision for its development towards knowledge based economy. The Peer Review team highlights the following achievements:

- Sustained increases of the R&D and Innovation public funding.
- The introduction new approaches based on Europe and worldwide paradigm.

The Policy Mix Peer Reviews team argued that:

> The long-term vision of Cyprus is to change into a knowledge-based society for which continuous political efforts as well increasing public and private investments in R&D would be pre-conditions. Indeed, continuity beyond political/planning horizons is the single most crucial element for its success (p.9).

More specifically, regarding *strategic orientation*, it is necessary to develop and promote a broader research and innovation concept that allows for an integrated policy framework for the benefit of a larger number of stakeholders in the knowledge-related society of Cyprus. The knowledge triangle policies (i.e. education, research and innovation) should be firmly embedded within the strategic policy thinking. Cyprus main strategic objective should be to help its labour force to become more entrepreneurial and to adapt its skills according to new up-coming demands from the market. There is a need to encourage curiosity-driven curricula in primary and

secondary education. In that case emphasis should be put on adequate training of teachers. It is required close liaison and cooperation between the universities (public and private), Ministries, the private sector and the Human Resources Development Authority, in order to define the necessary planning and ensure that national needs and private sector demands are met in terms of quantity and quality.

From *Governance* point of view the team was supportive to the creation of a National Research Council. This Council would have the remit of adopting strategic orientations for research, technology and innovation policies. It was strongly recommended that a feedback loop be created between the public administration and the research and innovation community in order to identify and address bureaucratic obstacles.

The funding of any development or strategic plan is an important parameter. These plans must be ambitious but also they have to be achievable. The resources are finite as they are the capacities of the various stakeholders to implement these efforts. For that reason the components of the *policy mix* must be appropriate and balanced. Referring to Policy Mix Peer Reviews report this will require:

- Supporting technological development and short term Research and Technological Development (RTD) that is needed by industry, including the tourist industry, maritime transportation and financial services: the role of the public research centres could be of assistance in this respect.
- Promoting the strategy for Cyprus to become a super-regional hub for education and learning: the quality of education is crucial for the attraction of students and requires strong ties with global educational services providers. It also requires leading edge telecommunications and internet infrastructures with high potential.
- Supporting universities to promote highly advanced research, with the aim of (a) producing human resources that will become the leaders of a new economy and (b) create spin-off commercial activities that will modify the industrial landscape (p.12).

The basic concept for Regional, European and global considerations, is the forthcoming Cyprus Presidency of the EU which offers an opportunity for a coherent national effort to showcase the country in terms of policy achievements and ambitions. Actually Cyprus could use its EU Council Presidency in 2012 as an opportunity to develop a mid-term strategy about the benefits of European Research Area (ERA) and the next generation of Community programmes for the country. The fact that Cyprus is an island requires constant attention to the issues of its connectivity with the rest of the world.

The Policy Mix Peer Reviews team comes in a conclusion that there is a strong energy and passion to further development in Cyprus. That is obtained from all the players contacted during this study. This needs better planning, coordination and cooperation in order to maximise its potential.

The *internal evaluation* is carried out by Louis N. Christofides and Maria Michael, members of Department of Economics and Economics Research Centre, University of Cyprus. This evaluation is presented in a form of paper in Cyprus Economic Policy Review Journal (2010). This paper examines how Cyprus compares with the EU on a number of structural indicators which are related to the Lisbon strategy as well with structural reforms for promoting economic growth and improving labour market conditions. It is a result of a project sponsored by the Planning Bureau and funded by the Research Promotion Foundation (RPF) through the Economics Research Centre (ERC).

The assessment is based on a growth accounting exercise which includes twelve indicators related to demographics, labour market and labour productivity components. The analysis refers to 282 indicators in policy areas related to Labour market, product and capital market regulations, Innovation and Knowledge and Macro-economy.

TABLE 17: Assessment of performance in policy areas for Cyprus

Policy areas -- Aggregate scores for CY	Level	Change
Active labour market policies	1	-2
Making work-pay: interplay of tax and benefit system	8	2
Labour taxation to stimulate labour demand	28	19
Job protection and labour market segmentation/dualisation	10	3
Policies increasing working time	10	**-8**
Specific labour supply measures for women	2	**-5**
Specific labour supply measures for older-workers	1	-3
Wage bargaining and wage-setting policies	14	13
Wage moderation	14	9
Wage differentiation	16	22
Immigration and integration policies	10	**-23**
Labour market mismatch and labour mobility	**-7**	**-10**
R&D and Innovation	**-21**	4
ICT	**-13**	3
Education and life-long learning	2	8
Sub-aggregate I: education	6	7
Sub-aggregate II: life-long-learning	**-5**	13

Source: LAF *(The LIME Assessment Framework)* Country Results- Cyprus. European Commission (2008)

Table 17 presents the score for each policy, both in terms of levels and changes. The score indicates a relative performance in relation with the EU15 average. Particularly the score in levels refers to the relative performance of the country in the last year available i.e. 2008. The score in changes refers to the relative progress of the country between the years 1999-2008. A policy area is considered underperforming if the score is equal to or less than **-4. T**he LIME Assessment Framework (LAF) is an analytical tool that can help underpin the assessment of policy challenges. Building upon the results of an extensive literature survey, it systematically

compares the performance of Member States in terms of GDP and twenty policy areas affecting growth, looking at both levels and changes, relative to EU15 as a benchmark.

In their paper, Christofides and Michael (2010) state that R&D and Innovation are identified as underperforming compared to the EU15 average. That conclusion is easily obtained from the above table as -23 is less than -4. The reason is basically the economic environment. For an economy like Cyprus, private R&D activities are limited. The Cypriot economy is based on services and 99% of private companies are smaller than 10 employees in size, so the creation of private R&D units is not possible. The government can only encourage the creation of private research units in very few fields with high-tech potential. Referring to Christofides and Michael (2010) the pharmaceutical industry seems to be growing so the R&D in this section may increase the employment of scientists in that field.

Information and Communication Technology (ICT) is an area where Cyprus is underperforming compared to the EU15 countries even though there is a potential for higher utilization of the opportunities offered by ICT. Christofides and Michael (2010) state that:

> The government should create more ICT units responsible for the creation and support of online services in all the basic public services. If most government services can be done online, people will save valuable time and avoid part of the bureaucratic procedures needed during work hours. Moreover, tourism and the real estate sectors can largely benefit from the use of online advertising and other facilities. Most people now book and pay for their flights, hotels and transportation services online, since it is much more convenient. Since tourism is an important sector for the Cypriot economy all companies should be able to provide online services if they want to remain in the market. The same holds for all real estate companies. The government could promote the use of online services offered by hotels and private companies through seminars and advising offices if necessary (p.66).

The above suggestion is very important as in the previous sections of this thesis I consider Tourism as the backbone of the Cyprus economy.

Education and life-long learning (LLL) seems to be a problematic area according to this internal evaluation. The main reason can be the weak performance in several parameters such as rate of early school leavers, life-long learning, participation in continuous training, investment by enterprises in training of adults, share of graduates over working age population.

Christofides and Michael (2010) state that:

> Cyprus has an extremely good performance in education, evaluated as above the EU15 average. Therefore, the weak productivity performance cannot be explained by low qualified personnel, but possibly other factors, such as the inefficient usage of tertiary graduates in public sector services, lack of infrastructure and poor organization. The government needs to provide the means and infrastructure, in order to fully exploit its tertiary education graduates. Creating job opportunities for researchers and scientists will prevent tertiary graduates from working in jobs irrelevant to their field of study, or looking for a job abroad. In other words, what the government needs to do is to give the opportunity to all qualified Cypriots to apply their knowledge and contribute to economic growth. Failure to do so, results in pure waste of resources. Regarding the education system there are still things that need to be done such as improving the vocational training system (p.67).

The overall internal evaluation of Cyprus High Skills knowledge, based on the work of Christofides and Michael (2010) comes, in a conclusion that:

> Cyprus needs to focus on policies related to R&D and Innovation, ICT, and sector-specific regulation in order to increase productivity and growth. Keeping in mind the small size of the Cypriot economy and its service orientation, R&D will in practice be largely concentrated (at least initially) on public expenditures on education and research infrastructures. This will (i) maintain the highly educated labour force in Cyprus (ii) produce knowledge and patents and, in time, achieve the full exploitation of the research output by Cypriots, (iii) encourage the employment of highly educated labour in the country instead of exporting it to other countries, (iv) use highly educated labour force in their field of study and avoid underemployment, and (v) establish a tradition in the exportation of educational and other related services through the attraction of foreign bona fide students (Christofides and Michael 2010, p. 69).

The findings of both the external and internal evaluation of Cyprus situation coincide with my analysis in the previous chapter regarding innovation, research and education. It is clear that my country has a long way to cover in relation to high skills knowledge. However, there is considerable government (the other stakeholders are trying to follow) intervention and initiative to achieve this target.

CHAPTER NINE

CONCLUSION

Cyprus, following its accession to the EU, is an organic part of a wider economic entity and is facing new challenges for adhering to the general targets of the EU and its guidelines and policies.

The characteristic of the Cyprus economy is the absence, at the moment, of any significant wealth producing natural resources (even though there is a lot of discussion regarding natural gas in the sea area of Cyprus). Human resources are, therefore, the most significant factor of production in the economy and the only means of success in this era of globalisation. As we have seen, education and training are considered in the literature to be a critical success factor for the enhancement of competitiveness, productivity and innovation as they deliver the required knowledge, skills and abilities to adapt to a culture of lifelong learning.

The relationship between formal education and work has been a subject of increasing public discussion throughout the twentieth century and one of the driving forces in recent demands for educational reforms. Skills development is one way in order to keep pace with rapidly changing job markets, revolutionary developments in information technologies and new global linkage.

However, in Cyprus there is a failure of policy attempts to develop closer links between education, including vocational education and the labour market. These policies have been the same irrespective of political parties. A good reference point, for the policy makers of the near future, can be a report of OECD (2009) regarding systemic innovation in vocational education and training. In that report systemic innovation is defined as any kind of dynamic system - wide change that is intended to add value to the educational processes. Systemic innovation is a useful analytical framework for the assessment of innovation policies in VET. In times of economic

crisis, a systemic approach to innovation in VET is even more urgently needed. Based on the certain OECD report the necessary conditions for such a system are:

- ❖ Develop a systemic approach to innovation in VET as a guiding principle for innovation-related policies.(a clear policy intended to support vet research in the light of national priorities, both at policy and practitioner levels).
- ❖ Promote a continuous and evidence-informed dialogue about innovation with the stakeholders in VET.
- ❖ Build a well-organised, formalised, easy to access and updated knowledge base about VET, as a prerequisite for successfully internalising the benefits of innovation.
- ❖ Supplement investments in VET innovations with the necessary efforts in monitoring and evaluation.
- ❖ Support relevant research on VET according to national priorities and link these efforts to innovation.

However, while this might be an interesting recipe, it has not been used in Cyprus for the reasons given. Indeed, it seems that the issues surrounding the political economy of skills and competitiveness in Cyprus is one of inertia despite the best advice by international organisations and from the sophisticated theories discussed in the first part of this thesis, with the exception of Brown et al (2011) view.

Brown et al (2011) argued that simply investing in skills upgrading is no longer a source of competitive advantage on its own. Those factors concerning location and price, as well as the introduction of Digital Taylorism, all undermine Western supply-side efforts at improving competitiveness. In Cyprus, it might be thought that there could be a cost advantage, compared to other European countries but Cyprus is also part of the Euro. The paradox is that much of the Cypriot economy is not subject to the global auction because it is based on face to face interaction, e.g., tourism but that it is hard to see how the tourist industry can overall be upgraded in terms of skills to take advantage of this.

If one door is shut with respect to the global auction, another is shut because of the traditional aims of Cypriot education. The goals of the Cypriot education system have traditionally been far more focused on an education for national identity and citizenship than for the economy. Although, there is now intense debate and some reform which may steer Cyprus in the direction signaled in the second chapter of this thesis.

According to Livingstone (1999) the economy can dictate what jobs are available, what new jobs must be created, and those which must be eliminated or left behind, in other words the demand side. At the same time, education must also develop to mesh with these. Livingstone points out that more is needed in assessing this education/job relationship than just formal qualifications of an individual; he stresses the need for a more comprehensive and multidimensional approach.

He defined six 'faces' of underemployment: the talent use gap, structural unemployment, involuntary reduced employment, the credential gap, the performance gap and subjective underemployment (Livingstone 1999,p.52). The credential gap is defined as the difference between education attained and education required for entry into the job. The credential gap is created when employers continue to raise the bar and require more and more educational credentials for jobs, credentials which may have no bearing on the skills required for that job. The performance gap is defined as the difference between education attained and the education needed to do the job adequately. Subjective underemployment is the workers' sense of whether or not their knowledge and abilities are being adequately utilized in their jobs.

Livingstone prefers a community economic development model, based on the social economic tradition of co-operatives and mutual supports that sustain communities. Also it will be a link between learning and its applications in all areas of our lives. To make this a reality, he argues that employers need to recognize the critical and creative thinking, skills necessary for a viable economy. They also need to place greater emphasis to knowledge gained through non-formal and informal learning.

Based on the above, we can explain the paradox of the Cypriot economy: that it has a highly qualified workforce but where most employment is low skilled. So there are two points here: first

that this contradicts human capital theory which assumes that employers will respond to the supply of high skills by introducing high skilled work and second, it raises questions about the link between credentials and skills.

It is easy enough to outline the measures that need to be taken into account in the enhancement of productivity and of the competitiveness of the economy. The key challenges for Cyprus can be summarized in the increase of the diversification of the economy towards higher value added activities via, mainly, an increased utilization of the comparative advantages of the island. Some other challenges are the promotion of Research Development and Innovation, facilitation of ICT diffusion, structural reforms targeted at enhancing competition and improving the overall business climate, upgrading of basic infrastructures, further human capital development, enhancement of the links of the educational system to labor market needs, development of a comprehensive national framework for lifelong learning, continuous upgrading and adaptability of skills to labor market needs. However, none of these initiatives will contribute to a higher skilled economy if the demand for these skills does not exist. As indeed it does not.

Skill formation theories do not explain the production of skill in Cyprus since there are no institutions embedded between the education systems and the labour market, either with respect to political direction or as intermediaries between education and the labour market that enable the appropriate production of skills.

There are several reasons for this. Firstly, they are historical and relate to the conflict on the island. Secondly, economic growth has been satisfactory to good and this, in itself, may have discouraged an intense focus on developing a high skills economy. Thirdly, being a small economy that is subject to many forces, much of the demand for skilled workers is unpredictable, as the possible example of finding under-sea gas suggests. Fourthly, the entrance to the EU, the high number of immigrants who are over qualified and the numbers of highly qualified young Cypriots have all given negative impetus to the search for a high skills route because it was assumed that the possession of these well qualified workers would lead to a High Skills Economy.

The purpose of this thesis has been to raise the major questions that need addressing about the lack of development of a high skills route: ideally one where the industries in which the skills are employed, produce goods and services that can only be produced in Cyprus or in which Cyprus has a significant competitive advantage. However, as a consequence of the eight years of research, it has been necessary to change the research question to that of what does the experience of Cypriot policy and practice tell us theories of skill formation.

The answer is that High Skills orientation is not a panacea in small countries like Cyprus. Cyprus has not been able to address issues of skill formation so that indeed none of the skill formation theories that can apply do it in any satisfactory sense. That is because:

- The role of education in Cyprus has been intimately linked to its history, especially a history that has stressed nationalism.

- The strongly academic influence of Greece.

- The unpredictable nature of demand for skilled labour in a small island economy.

- Tourism (basic economical product) is mainly low skill but because it demands face to face interaction, although it is sheltered from the Global Auction.

At this time Cyprus is in a junctural point. The discovery of gas will change the economic horizons of the country, as will the economic crisis. It could change the demand for skilled workers, although whether the Cypriot vocational education system could respond appropriately and flexibly is another matter.

That is an important question, especially at a time when Cyprus will be seeking to live up to the aspirations of being a member of the EU formed when it first entered. From the 1st of July 2012 Cyprus will be in the Presidency of European Union.

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APPENDICES

APPENDIX 1: Average mathematics scores of fourth- and eighth-grade students 2007

(Source : *Third International Mathematics and Science Study 2007)*

Grade four		Grade eight	
Country	**Average score**	**Country**	**Average score**
TIMSS scale average	**500**	**TIMSS scale average**	**500**
Hong Kong SAR	607	Chinese Taipei	598
Singapore	599	Korea, Rep. of	597
Chinese Taipei	576	Singapore	593
Japan	568	Hong Kong SAR	572
Kazakhstan	549	Japan	570
Russian Federation	544	Hungary	517
England	541	England	513
Latvia	537	Russian Federation	512
Netherlands	535	United States	508
Lithuania	530	Lithuania	506
United States	529	Czech Republic	504
Germany	525	Slovenia	501
Denmark	523	Armenia	499
Australia	516	Australia	496
Hungary	510	Sweden	491
Italy	507	Malta	488
Austria	505	Scotland	487
Sweden	503	Serbia	486
Slovenia	502	Italy	480
Armenia	500	Malaysia	474
Slovak Republic	496	Norway	469
Scotland	494	**Cyprus**	**465**
New Zealand	492	Bulgaria	464
Czech Republic	486	Israel	463
Norway	473	Ukraine	462
Ukraine	469	Romania	461
Georgia	438	Bosnia and Herzegovina	456

Iran, Islamic Rep. of	402	Lebanon	449
Algeria	378	Thailand	441
Colombia	355	Turkey	432
Morocco	341	Jordan	427
El Salvador	330	Tunisia	420
Tunisia	327	Georgia	410
Kuwait	316	Iran, Islamic Rep. of	403
Qatar	296	Bahrain	398
Yemen	224	Indonesia	397
		Syrian Arab Republic	395
		Egypt	391
		Algeria	387
		Colombia	380
		Oman	372
		Palestinian Nat'l Auth.	367
		Botswana	364
		Kuwait[6]	354
		El Salvador	340
		Saudi Arabia	329
		Ghana	309

APPENDIX 2: Average science scores of fourth- and eighth-grade students 2007
(Source: *Third International Mathematics and Science Study 2007)*

Grade four		Grade eight	
Country	**Average score**	**Country**	**Average score**
TIMSS scale average	**500**	**TIMSS scale average**	**500**
Singapore	587	Singapore	567
Chinese Taipei	557	Chinese Taipei	561
Hong Kong SAR	554	Japan	554
Japan	548	Korea, Rep. of	553
Russian Federation	546	England	542
Latvia[2]	542	Hungary	539
England	542	Czech Republic	539
United States	539	Slovenia	538
Hungary	536	Hong Kong SAR	530
Italy	535	Russian Federation	530
Kazakhstan	533	United States	520
Germany	528	Lithuania	519
Australia	527	Australia	515
Slovak Republic	526	Sweden	511
Austria	526	Scotland	496
Sweden	525	Italy	495
Netherlands	523	Armenia	488
Slovenia	518	Norway	487
Denmark	517	Ukraine	485
Czech Republic	515	Jordan	482
Lithuania	514	Malaysia	471
New Zealand	504	Thailand	471
Scotland	500	Serbia	470
Armenia	484	Bulgaria	470
Norway	477	Israel	468
Ukraine	474	Bahrain	467
Iran, Islamic Rep. of	436	Bosnia and Herzegovina	466
Georgia	418	Romania	462

Colombia	400	Iran, Islamic Rep. of	459
El Salvador	390	Malta	457
Algeria	354	Turkey	454
Kuwait	348	Syrian Arab Republic	452
Tunisia	318	**Cyprus**	**452**
Morocco	297	Tunisia	445
Qatar	294	Indonesia	427
Yemen	197	Oman	423
		Georgia	421
		Kuwait	418
		Colombia	417
		Lebanon	414
		Egypt	408
		Algeria	408
		Palestinian Nat'l Auth.	404
		Saudi Arabia	403
		El Salvador	387
		Botswana	355
		Qatar	319
		Ghana	303